STRATEGIC PLANNING AND ORGANIZATIONAL HEALTH:

A SYSTEMS APPROACH

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A SYSTEMS APPROACH

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SUMMARY

The purpose of the dissertation is to improve the conceptual tools available for organizational planning. The objective is to show that the metaphor of the organization as a living system can be developed into a well-defined concept and used to refine a general process model for planning. A secondary objective is to illustrate parts of the process by identifying strategic alternatives for the class of organizations designated as the American University.

Planning is viewed as a continuous process containing conceptually discrete activities joined by both feed forward and feed back information flows. A general model is abstracted from the planning literature, and this model is expanded and refined through the use of concepts developed in the dissertation. These concepts include viewing the organization as a system at different levels in Boulding's hierarchical categorization scheme and a definition of organizational health based on a normative development sequence which parallels Maslow's postulated hierarchy of human needs. The result is a refined process model for strategic organizational planning which can be applied to any type of organization.

One step in the process, the generation of strategic alternatives, is further detailed by a flowchart and illustrated through a Delphi study which identifies strategic alternatives for the American University. The Delphi study utilized respondents from several different backgrounds, and the results may be used as inputs to detailed

planning by individual universities.

The dissertation concludes that the metaphor of the organization as a living system, as developed, is useful for refining a general model for strategic planning and that the resulting model is useable in generating alternatives for the university. Extensions of the study and research which would complement this study are recommended.

CHAPTER I

INTRODUCTION

Purpose

The purpose of this dissertation and the research it represents is to improve the conceptual tools available for organizational planning. The intended outcome is a refined process model for organizational strategic planning.

Objectives and Scope

The specific primary objective of the research is to show that the metaphor of the organization as a living system can be developed into a well-defined concept and used to refine a general process model for organizational strategic planning. A secondary objective is to illustrate parts of this process by identifying strategic alternatives for the class of organizations designated herein as the American University.

The research includes an overview of strategic planning literature and the abstracting of planning fundamentals from this literature. The development of the metaphor of the organization as a living system includes the use of a set of different systems levels and the defining of a healthy organization in terms of characteristics at these levels. The study includes the synthesis of the metaphor with the fundamentals of planning and the development of a refined normative model for strategic planning. One step in this model is further refined and a

procedure for carrying out this step is defined through text and a flowchart. Included in the procedure is a checklist type of criterion to determine the adequacy of the results when the procedure is utilized.

The study includes the illustration of the procedure by applying it to a category, or type, of organization, the American University. The study does not include applications of the entire planning model nor applications of the particular step to specific individual organizations, and it does not include any case studies.

Context and Rationale

The areas of study in which the research is conducted are characterized by changing concepts. Planning theory has been described as being in a "predisciplinary stage" (Sackman, 1970); there is no "theory of planning" which is widely accepted and the procedures for planning are still being developed. In organization theory, there are dissatisfactions with past organizational concepts and searches for new metaphors to replace older concepts which seem too rigid. More recent organizational concepts emphasize the purposive nature of organizations.

In summary, the context of this research is that of organization theory and planning theory. Both fields are in transition periods and in changing states of development, and the fields overlap because both strategic planning and newer organizational concepts emphasize organizational purposes and goals.

The metaphor of the organization as a living system appears to be a basis on which a framework can be structured which would formally link organization theory and planning. This metaphor and the resulting

framework have the potential to provide decision makers and chief executives in organizations with intuitive and heuristic guidance on formulating and conducting strategic planning activities. For the metaphor and framework to be useful, however, the metaphor needs to be more thoroughly defined, its overall applicability to the planning process established, and the resulting synthesis shown to be useable.

General Approach and Overview

Approach

For the purposes of this study, strategic planning is approached as a continuous process consisting of a collection of logical steps, or activities, with information fed forward and fed back among the steps, as in systems models of the mental process of problem solving. The basic planning model is defined by a sequence of fundamental steps abstracted from the planning and futures literatures. The basic model is refined by expanding and further defining these fundamental steps using the concept of systems levels of an organization and the concept of organizational health. The refined process model is shown to be useable by defining a detailed procedure for conducting one of the steps and then by applying this procedure to identify strategic alternatives for the University.

Overview

The remainder of this dissertation is organized into six chapters. To preserve the continuity and perspective of the major objectives, some details of the University study are contained in Appendixes.

Chapter II is an overview of the planning and futures literature.

It contains a definition of strategic planning and concludes with a summary of planning fundamentals expressed as a basic model for the planning process.

Chapter III develops the metaphor of the organization as a living system. It describes a multi-level classification scheme for systems suggested by Boulding (1956) and shows that these systems levels may be used to describe an organization as a system which has multiple characteristics. This chapter also develops the concept of organizational health and defines a healthy organization in terms of a normative development sequence and in terms of particular characteristics at the different systems levels.

Chapter IV develops a refined process model for strategic planning by applying the results of Chapter III to the basic model abstracted from the literature and summarized in Chapter II. The potential advantages of the refined model are summarized.

Chapter V illustrates the additional detail and guidance possible with the refined model by further specifying how to conduct one step in the model. The chapter develops a procedure for the generation of strategic alternatives for an organization and relates the inputs and outputs of this procedure to preceding and subsequent steps in the strategic planning process.

Chapter VI demonstrates the utility of the procedure developed in Chapter V through the design, execution, and evaluation of a Delphi study which identifies alternatives for the University. The implementation of each step in the procedure is described.

Chapter VII summarizes the major research findings and concludes with an outline of recommended research areas and approaches.

CHAPTER II

OVERVIEW AND CRITIQUE OF STRATEGIC PLANNING CONCEPTS

Scope

This chapter provides an overview of the planning literature and the related futures literature. Strategic planning is defined, and the process of strategic planning is outlined by a general sequence of steps. The chapter includes a critique of the currently available planning literature, and the relationship of later chapters to the literature currently available is summarized.

The Planning Literature

Planning is not a new concept. Genesis 8 describes the plans for Noah's ark in some detail, and Machievelli, in The Prince, describes strategies required for success by a ruler under different circumstances. Moreover, the underlying concept of planning, stated as "decide what you want to do, then decide how to do it," to paraphrase Argenti (1968), is hardly profound.

Nonetheless, the interest in planning grew tremendously during the decade 1960-1970. Henry (1967) found an increasing number of companies that formally recognized the importance of systematic planning by establishing a planning staff, by appointing an executive whose responsibilities included planning, or by adopting a formal planning procedure. Mockler (1970), in his review of the planning literature, verified an increasing interest in both planning theory and practice.

He points out that before 1960, there was only one book-length publication -- a collection of articles -- on the subject of planning. Between 1960 and 1970, however, there were twenty-five book-length treatments of the subject.

According to Mockler, LeBreton and Henning (1961) wrote the first book which attempted to develop a comprehensive outline of the "science of business planning." LeBreton and Henning suggest that the role of planning is four-fold: 1) to establish goals and objectives, 2) to determine policy and procedure, 3) to prepare plans, and 4) to implement. They listed the dimensions of planning as complexity, significance, comprehensiveness, time (frame), specificity, and completeness. Other factors viewed as important included frequency of making plans, confidential nature of a plan, flexibility and formality, authorization, ease of implementation, and ease of control. The steps in planning were viewed as first, the choice of objectives -- both for the firm and for the plan; second, the gathering of data used for the evaluation of the plan; third, communication of the plan to those it involves; and fourth, using persuasion to assure adoption of the plan. The organization that would perform these functions would depend on the circumstances, perhaps utilizing a committee, top management, or specialists.

The inclusion of persuasion as a final step in the planning process might seem somewhat old-fashioned, viewed in the light of "modern" organization theory and approaches to management. However, Black (1970), almost ten years later, implies a similar step in planning when he includes "salesman" in his description of the desirable characteristics of a planner.

Branch's The Corporate Planning Process (1962), although published only a year after the LeBreton and Henning book, has a much broader perspective. Rather than concentrating on the generation of a plan, much as one would create a static picture (a snapshot), Branch views the planning process as a moving picture. The process must have a built-in flexibility that provides a capability to change the plan but preserve the process. Branch also points out that the planning implies that changes will occur and that the manager will either be a judge of the changes or a leader of the changes. However, Branch (as did LeBreton and Henning) deals lightly with the problem of setting goals and the problem of choosing a plan.

Collier (1968) repeats the theme of planning as a dynamic process. In the terminology of control systems, he views the planning process as requiring both closed-loop characteristics and open-loop characteristics. Closed-loop aspects are particularly important once goals have been set and progress toward these goals needs to be monitored. Open-loop characteristics are especially important over the long run, where one is concerned with a search for higher goals and maintaining an awareness of possible new goals which may evolve from past experience.

In addition to these descriptions of the generic function of planning, there has been increasing interest in what is known as strategic planning and long-range planning. Although these terms are sometimes used interchangeably, many writers (e.g., Anthony, 1965) believe that "strategic" is the preferred terminology. "Long-range" for a company just getting started may mean 6-12 months and may have the

same connotations as a 10-15 year horizon for an established company or institution. Anthony's suggested definition for strategic planning is assumed throughout this dissertation:

> Strategic planning is the process of deciding on objectives of the organization, on changes in these objectives, on the resources used to obtain these objectives, and on the policies that are to govern the acquisition, use, and disposition of these resources.*

Attempts to stimulate or to carry out such a process are often frustrating. There is a general tendency for managers to spend all their time on short run goals and day-to-day operational problems. Strategic considerations, essential for long run success, are allocated inadequate thought and time in the rush to maximize daily efficiency and short term payoffs. Many factors contribute to the preservation of this general tendency. Warren (1966) points out the problems of measurement and control: efforts on short run goals and day-to-day efficiency may be measured by profits, but long run success can be measured a priori only indirectly through such surrogate variables as product leadership, market position, employee attitudes, personnel development, etc. This problem is compounded by the fact that most managers hold their position for less than five years; the average is about four years (Warren, 1966, p. 70). Warren emphasized the necessity for a proper balance between operational and strategic efforts. He implies that top management commitment to long range efforts is essential.

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*Steiner (1969), p. 34, uses an almost identical definition.

A corporate staff, consisting of some of the most capable men available and utilized to critically review the division's five year plans, may be helpful in assuring that adequate time and effort is devoted to the long range picture for the divisions. However, adequate assistance to the divisions in planning should be made available, and the same staff should not both provide the assistance and do the critical review.

McGlauchlin (1968) described Honeywell's methodology for technical planning. Basically a procedure for evaluating proposed research, methodology divides the responsibilities for the procedure among top management, division management, and the research scientist. The research scientist is asked to recommend basic investigations and studies which would contribute to knowledge. The division manager lists potential projects and indicates their relative importance, contribution to corporate profit, alternative solution, etc. He also assures that the recommendation is a joint engineering and marketing recommendation, that the proposals are reviewed appropriately, and that the topics are suitable for an effort by the corporate research group. Top management reviews the recommendations, evaluating them in terms of Honeywell's market factors, and the suitability for research at the corporate level.

Honeywell has also developed a method called PATTERN which applies relevance tree analysis to national goals in order to approximate the relative importance of specific technological activities (Sigford and Parvin, 1965, and Esch, 1971). Although this method is suggested for corporate planning, there seems to be no evidence that it has been applied to corporate planning at Honeywell or elsewhere.

Haggerty (1967) and Fischer (1969) describe the Texas Instruments approach to planning and self-renewal. Chairman of the Board and Chief Executive Officer of Texas Instruments (TI), Patrick Haggerty, believes that innovation -- including, but not limited to, product innovation -- is the key to renewal, useful products and services, and (therefore) profitability. As a consequence, TI uses a relatively structured "OST" system to stimulate innovation. The components of the concept, corresponding to the three letters of O, S, and T, are: Objectives -- a statement of the goals to be achieved within a business area, through a corporate-wide activity, or by the entire company within a given period of time; Strategies -- the general course(s) of action to be pursued; and Tactics -- specific programs which must be carried out. By having these components written in succinct, yet complete, statements, Haggerty believes that the OST system successfully diffuses throughout divisional and corporate management (1) recognition of the responsibility for initiating innovative programs, and (2) improved ability to conceive, describe, and pursue such programs.

One might notice certain similarities between the Honeywell and Texas Instruments approaches. Both are essentially information systems, distributing ideas, concepts, and plans from one part of the organization to another; both involve corporate and divisional management; both represent attempts to assure that activities throughout the company are consistent with each other and with company goals and policy. However, Honeywell's approach places an emphasis on recommendations coming from the lower levels of management and the researchers, with top management's role being that of reviewer and evaluator. The TI approach seems to

emphasize information flowing the opposite direction in the organization chart, from top management, who set objectives, decide on strategies and suggest tactics, to divisional and lower management.

Baker, et al., (1971) describe similar systems in which budget, or resource allocation, decisions are made after a sequence of information exchanges in a hierarchical administration structure: information flows both from superordinate to subordinate and from subordinate to superordinate.

Paul Black (1970) suggests a conceptualization of planning that is very similar to the "OST System" of Texas Instruments. Black considers four aspects of planning: the foundation -- general goals, philosophy of management, etc.; the objectives -- stated explicitly, so that "you know you're there when you're there"; actions -- which flow from a study of the steps necessary to achieve the objectives; and resources -- those resources needed to back up the actions that are to be taken. These four aspects are reflected in plans for three different time perspectives: a strategic (long-range) plan, an operational plan (one or two years), which contains an operations budget, and a development plan, which reflects a time perspective longer in range than the operational plan but less than the strategic plan.

Black describes the planners' job as one of visualizing and designing a planning system that meets the needs of the organization's management, of proposing ideas, of analyzing the company's momentum and external trends, of suggesting alternative approaches to achieving the company's objectives, of seeing that plans are properly documented. To do this job, Black asserts, the planner should be highly analytical

and at least moderately theoretical in approach, a catalyst and integrator, a conceptual, system-oriented thinker, and a salesman of ideas and concepts.

Steiner (1970) describes the role of corporate planner in a similar way. The planner's job is that of guiding change, and stimulating innovation. He functions as an educator, helping managers see that the management job is one of managing a series of related systems. Steiner also points out that, conceptually, one may split the role of planner into two different roles: that of long-range (strategic) planning and decision-making and that of organizing the planning function itself. The second role becomes more "operational" in nature than the first role, which is more conceptual and analytical.

Steiner (1969) has written one of the more comprehensive books on planning currently available. The book, Top Management Planning, is arranged in four basic sections: the basic nature of planning, the process of planning, the (available) tools for more rational planning, and planning in the major functional areas.

In the first section, Steiner points out that planning is concerned with the future. More precisely, planning is dedicated to the philosophy of action (in the present) on the basis of contemplating the future. The process of planning is viewed as being systematic, with continual review, and as consisting of general objectives, more specific strategies and policies, and (finally) rather detailed plans. Steiner visualizes planning as being structured in blocks of time, all integrated, but with each having its own level of development.

In the second section, Steiner describes ways in which the process

of planning can be formalized within a company. He includes the alternative organizational structures (a planning staff, a small committee of line executives, only top management, etc.), the importance of clearly-defined corporate aims and goals, and the use of forecasting to provide a framework for constructing strategies and policies. The eventual aim of this process is effective action.

In the third section of the book, the focus on the tools of decision making is prefaced by a description of the decision-making process as (a) one that is sequential and iterative, complex, and fluid and (b) one that involves many non-quantifiable variables, i.e., judgement. The tools of such a process are naturally quite varied, ranging from the very practical, but limited, scheduling methods (from Gantt to PERT) to more analytical, but incomplete, models (from conceptual systems models to rate-of-return and linear program models).

The fourth section of the book is devoted to more particular descriptions and techniques of planning in the particular areas of marketing, finances, products, diversification,and research and development.

Gilmore (1971) suggests that extensive formalized planning structures are not necessary for effective planning in smaller companies. He suggests that through meetings of key managers, a "closed loop" system of planning can be effected. By "closed loop," he means that the characteristics of a closed loop control system are reproduced in the planning process. Rather than waiting until a problem is evidenced before reassessing the company's directions (an open loop characteristic), he suggests that there be a continual reappraisal of the current

strategies comparing them with the current situation and a continual effort to formulate and implement strategy through executive action. He describes this process as consisting of the following steps: (1) recording the current strategy, (2) identifying problems through an analysis of the current environment (trends and developments) and of the current operating situation, identifying strengths and weaknesses, (3) discovering the core elements (distinguishing between symptoms and causes), (4) formulating alternatives, (5) evaluating alternatives, and (6) choosing a new strategy.

Gilmore's paper is based on a model, developed at Cornell, of the relationship between a company and its competitive environment. This model suggests that the "strategy of the enterprise" consists of three components: economic mission - concerned with the kind of business the company should be in and what its performance objectives should be; competitive approach - concerned with finding the product-market-sales approach that will accomplish the economic mission and with deriving the pertinent goals in the various areas of the business; program of action - involves a search for an efficient means of implementing the competitive approach.

Mason (1969) suggests "A Dialectical Approach To Strategic Planning." He believes that a good planning technique should expose the assumptions underlying the choice of plans and should suggest new, more relevant assumptions upon which the planning process can proceed. The planning process, he points out, has three characteristics: a concern with future states (of the organization), a seeking to secure a desired (according to its underlying value system) future state,

and a conviction that the organization's management has a choice from among two or more behavior patterns for the firm's activities. This leads him to suggest a dialectical approach: the situation is examined completely and logically from two different points of view. This is accomplished by making a plan, then searching for an alternative -- the "counterplan," then examining the conflicts between the two plans via structured debate. This approach, Mason believes, meets the criteria for a good planning technique because the existence of two alternatives and the issues raised in the debate expose the underlying assumptions and can create new assumptions.

Sackman (1970) reviewed the state of the art in planning as part of his critique of, and recommendations about, advanced research in on-line planning, i.e., research on planning techniques which utilize computer capabilities via demand terminals. He concluded that planning is in a "predisciplinary stage," experiencing rapid growth and change. Such a conclusion leads him to suggest that a unifying framework is needed. Any attempt to provide this unity, he believes, would not be premature, even though it might necessarily be immature. One point of departure is a general definition of planning, and Sackman offers the following:

> Planning refers to plastic evolving hypotheses concerning system objectives and system performance in specified environments, including embedding ecosystems, to achieve desired levels of operationally defined effectiveness, within stated resources, throughout the life-cycle of the object system and successor systems.

This definition satisfies several criteria which Sackman believes are necessary at this stage of planning theory development. Specifically,

the definition emphasized that:

- plans are hypotheses;
- planning takes place in an evolutionary system context;
- plans must be operationally defined -- i.e., testable in the real world; and
- plans are formative human creations of desired features within time and resource constraints.

As mentioned above, Sackman was concerned with research in online planning. In this context, he views the trend toward the involvement of an increasing circle of individuals in the planning process as being potentially revolutionary. The potential is enchanced considerably because of the increasing capabilities and utilization of time-shared computers for online problem-solving. At the present stage of development of planning structures, and with the present state of the art in online problem-solving, Sackman does not expect dramatic accomplishments right away.

Futures Studies

The increased interest during the 1960's in planning stimulated parallel efforts in "futures studies," studies which attempted to anticipate the future through the anticipation of business environments and economic cycles, of technological developments, of political developments, etc. Like planning, studies of the future are not recent inventions. From the early Hebrew prophets to the science-fiction writers of the 1940's and 1950's, writers have attempted to probe the inherently unknown future. Some, like Jules Verne and Arthur C. Clarke, have been remarkably accurate in their anticipation of technological developments.

The distinguishing characteristics of recent efforts are the attempts to be more systematic in approach and the development or adoption of techniques to aid these attempts. The discussion which follows is an overview of these efforts. Jantsch (1967) and Bright (1968) provide extensive discussions and bibliographies.

Bertrand de Jouvenel (1967) speaks of the "art" of futures studies. He seems to believe that thinking about the future will never develop into anything other than an art, but he does treat it as an art that is tied to practical needs (i.e., to decision-making). Although he describes game theory approaches and simulation techniques, his discussion focuses on conjecture and reflection: one foresees a particular course A at a particular time, one counts on a relationship between A and B, therefore one foresees a particular course B at a particular time. In such a sequence of thoughts, one risks several errors. Not only can the fundamental assertion about A be wrong, but also the assumed relationship between A and B can be incorrect. Regardless of the accuracy of the assertion and the assumed relationship, however, conjecture can fulfill the useful function of helping to initiate further investigation. As in the use of a "working hypothesis" to begin a systematic scientific inquiry, conjecture may be used to establish an initial direction and framework which may be modified by the results of further analysis and observation.

Conjecture is widely used, both casually and carefully. In his book, de Jouvenel gives examples of both approaches, and points out that it is not always correct to assume that the more carefully reasoned conjectures are the more accurate.

One occasionally is able to witness a writer changing his conjectures. Bennis and Stater (1968) and Bennis (1969) suggested that democracy in an organization was inevitable, and they presented their case in an intellectually convincing argument. Their ideas had been developed over several years, and Bennis (1969--reprinted from a 1966 article) listed the threats to bureaucracy which seemed to be increasing in intensity: rapid and unexpected change; complexity of modern technology, leading to the necessity to integrate very diverse activities and persons with highly specialized competence; a growth in size where the volume of an organization's traditional activities is not enough to sustain this growth; and a basic threat springing from change in managerial behavior.

A few years later, however, Bennis (1970), in another article entitled "A Funny Thing Happened on the Way to the Future," modified his previous view on the inevitability of democracy. Through his experience at SUNY-Buffalo, he found that institutions had built-in forces which resisted democracy. One of the results of his experience was that he modified his view to place more emphasis on judicial and legislative processes in public bureaucracies.

Davis (1970) furnishes another example of conjecture. He foresees a crisis in production management as workers' expectations of satisfaction from a job exceed the satisfactions available to them. Davis views this problem as one of the aspects of the transition from the industrial to the post-industrial era. He believes that studies presently underway suggest that the answer lies in the modification of jobs to include the characteristics of greater autonomy, adaptability,

variety, and participation. Though it remains to be seen if these characteristics will actually develop, the experiences of Proctor and Gamble (Krone, 1970) seem to support Davis's conjectures.

The Delphi technique, developed at RAND over the past several years, also involves the use of opinions (conjecture), but it attempts to take advantage of additional information that should be available in a group of thinkers. In their early attempts to utilize groups of experts, the RAND researchers found that face-to-face discussions had several disadvantages. A dominant individual would sometimes overwhelm the other members of the group and dominate the discussions. The familiar "bandwagon effect," whereby the members of the group exert both overt and subconscious pressure on dissenters to assure conformity and to promote a consensus, also seemed to be a limitation. The Delphi procedure attempts to reduce these undesirable effects through its three distinguishing characteristics:

1) questionnaires are used to elicite the opinions of members of the group;

2) the procedure is iterative, with controlled feedback to the respondents between rounds;

3) the group opinion is defined as an appropriate aggregate of individual opinions on the final round.

The rationale for the Delphi technique and a summary of the RAND investigations on the mental processes of the individuals as they participate in the procedure may be found in a series of RAND memoranda: Dalkey (1969 c), Dalkey, et al. (1969), Brown, et al. (1969), and Dalkey, et al. (1970). Two articles in the journal Futures summarize more concisely the same studies: Dalkey (1969 a, 1969 b).

The Delphi technique has been utilized most extensively in technological forecasting. Helmer (1966 b) reports on a pilot study of educational innovations; in a later study (Helmer, 1967 a), he surveys the "world of the year 2000," looking at such developments as the widespread (legal) use of personality-control drugs, a manned landing to Mars, and numerous automata (credit card economy, personal video communication). Martino (1968) reported on the procedural aspects of a Delphi study within the defense department. North and Pyke (1969) used a Delphi procedure in their study of threats to, and opportunities for, TRW, collecting the results into a SOON (Sequence of Opportunities and Negatives) chart.

Helmer (1966 a) suggests that the Delphi procedure, or some similar procedure, would be useful for much-needed efforts in long-range economic forecasting, political forecasting and planning, urban redevelopment, and educational reform.

Dror (1969) points out that when one is concerned with social or technological alternatives, one should include an evaluation of the political feasibility. He suggests using the Delphi approach to obtain sample estimates of the political feasibility, to isolate the factors which determine feasibility, or to investigate in depth the problem by estimating the contributory effects of several factors. Rescher (1969) suggests a similar use for the Delphi approach: to determine the values of a group, the areas of consensus or divergence, the subgroupings of values within a group, and the way in which a group uses values to reach decisions.

In a comprehensive study of societal developments, de Brigard

and Helmer (1970) used the Delphi technique to forecast potential developments that would help picture the future of society. In addition to identifying the potential developments and estimating their likelihood, the Delphi study also estimated the social impact of previously identified technological developments. These results then were discussed in seminars with the sponsors of the study. The outcome of these discussions was a sharper focus to the policy issues raised by the results of the Delphi study, and the final report includes a summary of the critical policy issues.

Another way of providing some structure to the process of eliciting and utilizing opinions from more than one individual is through the use of simulation games. Games usually have several players, each of whom may assume a role which he then plays as he interacts with the other players. The game begins with a given set of initial conditions, and play proceeds according to rules or guidelines, with players cooperating or competing. Depending on the purpose of the exercise, the play may be carefully specified by detailed rules or may be only loosely channeled by guidelines or general objectives. As pointed out by Ayres (1969), this approach is well developed in the area of military-political strategy, where it is used for training and for gaining insights into possible future environments. The approach is also being developed for non-military uses. Enzer, et al. (1969), describes a game whose purpose is to investigate alternative state policies. Such a game was used to look at future issues and opportunities in the state of Connecticut (Enzer and de Brigard, 1970).

Probably the most widely-used technique for anticipating the

future is the extrapolation of time series, generally referred to as "trend extrapolation." A continuous curve of some assumed form is fitted to historical data on some variable, and the future values of the curve are assumed to be indicative of the future behavior of the variable. One of the most familiar uses of this technique is in business economics. The National Board of Economic Research publishes many economic indicators, with extrapolations, which many economists and businessmen find adequate as aids to, or as manifestations of, economic forecasts. More complicated studies extrapolate curves fitted to data from relatively narrow segments of the economy, then combine these projections into a forecast for GNP (for example). Stock market analysts and investment advisors are using similar, if less complex, techniques when they base buy-sell decisions or advise primarily on "chart" information.

Technological forecasting by trend extrapolation has been developed into a useful tool, although it does have some pitfalls. Lenz (pp. 57 ff. in Bright, 1968) and Ayres (pp. 77 ff. in Bright, 1968) provide examples of the use of trend extrapolation for forecasting, and Ayres (1969) provides an integrated overview of the approach and the rationale for using it. Particularly in technological forecasting, the assumed curve often is in the form of an exponential or power law. That is, the variable increases or decreases exponentially or geometrically with increasing time. However, infinite growth of a variable is seldom an acceptable or achieveable future, even though data over a short time period may be consistent with such a curve. Over longer periods, S-shaped growth curves of some form, derived from biological

models of population growth in a limited environment or, alternatively, from models of the diffusion process, are more appropriate.

Summary and Critique

The planning literature, with few exceptions,* exhibits considerable consensus on the fundamentals of rational, comprehensive planning, but there is no widely accepted and established theory of planning. This situation, described by Sackman (1970) as a "prediciplinary stage" of planning theory development, means that there is no clearly-identified, general framework for planning. However, the following sequence of steps recurs in different forms throughout the literature:

1. Evaluate the present situation.
2. Identify alternative future goal states.
3. Evaluate these alternative goal states and select the one (or the combination) which seems most desirable.
4. Identify alternative means of pursuing the chosen goal state.
5. Evaluate these means and select the one (or combination) which seems most desirable.
6. Implement the means chosen to pursue the goal.
7. Continue the process by repeating the above steps.

Steps 1-5 are considered tasks which fall within the scope of planning. Implementation, although an aim of planning, normally is excluded.

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*Lindblom (1959 and 1969) is one such exception, claiming that a simple incremental approach, initially optimizing a single variable, can equal or better more comprehensive approaches. However, this dissertation is limited to rational, comprehensive approaches to strategic planning.

Note that the sequence contains three different kinds of activities: analysis/evaluation (steps 1, 3, and 5), creative/generation (steps 2 and 4) and decision (steps 3 and 5).

Information feedback and iteration, as pointed out by several writers, including Gilmore (1971), Sackman (1970), and Collier (1968), assure that the above order of steps is not a rigid sequence of activity. For example, the evaluation steps (3 and 5) may suggest additional alternatives (for steps 2 and 4) which would require additional evaluation before the decision step is completed.

Anthony (1965) defines strategic planning as the process of deciding on the objectives of the organization, on changes in these objectives, on the resources used to attain these objectives, and on the policies that are to govern the acquisition, use, and disposition of these resources. The process of strategic planning follows the general outline given above, but the characteristics which distinguish strategic planning from other planning (e.g., financial planning, project planning, marketing planning, etc.) are its comprehensive nature and the fact that the organization is viewed both as a unit/overall system (in setting overall organizational objectives) and as a collection of systems (in setting policies which guide the actions of subsystems within the organization).

Although the sequence of steps for the process of strategic planning is defined by the above list, the literature does not provide guidance on how to execute each step in terms which are simultaneously general and operational. The general process model defined by these steps would be improved if guidelines/heuristics existed for identifying

or generating, alternatives and for selecting from among the alternatives.

The available literature on organizational strategic planning, in summary, includes both (1) personal, experiential accounts of how one organization has carried out the steps of strategic planning and (2) elegant, but often inoperable, conceptual suggestions of a general approach to strategic planning.

The following three chapters develop an approach to strategic planning which synthesizes the general approach to planning, as defined by the above sequence of steps, with a general framework for analyzing strategic organizational concerns and estimating the impact of alternative strategic choices. The synthesis results in a procedure for the generation of strategic alternatives and more detailed guidance on carrying out the steps in the planning process.

CHAPTER III

THE ORGANIZATION AS A SYSTEM

Scope

This chapter describes the hierarchical scheme for classifying systems suggested by Boulding (1956). This scheme is used as a multi-level framework to integrate different systems views of an organization. Examples of these different descriptions as they have occurred in the organization and systems literature are described and related to the multi-level framework.

The chapter includes a discussion of the concept of health and develops a definition of organizational health related to the hierarchy of individual needs postulated by Maslow (1954) and to the systems levels suggested by Boulding (1956).

Boulding's Classification Scheme

Boulding (1956) suggested a biologically-based scheme for classifying systems according to a hierarchy of nine levels:

1. The first level is that of static structure. It might be called the level of framework; for example, the anatomy of the universe.

2. The next level is that of the simple dynamic system with predetermined, necessary motions. This might be called the level of clockworks.

3. The third level is that of the control mechanism or cybernetic system, which might be nicknamed the level of thermostat. The system is self-regulating in maintaining equilibrium.

4. The fourth level is that of the "open system," or self-maintaining structure. This is the level at which life begins to differentiate from not-life: it might be called the level of the cell.

5. The next level might be called the genetic-societal level; it is typified by the plant, and it dominates the empirical world of the botanist.

6. The animal system level is characterized by increased mobility, teleological behavior, and self-awareness.

7. The next level is the human level, that is, of the individual human being considered as a system with the ability to utilize language and symbolism.

8. The social system or systems of human organization constitute the next level, with the consideration of the content and meaning of messages, the nature and dimensions of value systems, the transcription of images into historical record, the subtle symbolizations of art, music, and poetry, and the complex gamut of human emotion.

9. Transcendental systems complete the classification of levels. These are the ultimates and absolutes and the inescapable unknowables, and they also exhibit systematic structure and relationship.

The Organization Viewed as a System

Since it is made up of individuals and their interactions, a human organization might be classified as a system at level 8 in Boulding's hierarchy, the social system level. Rather than describing the organization solely at this level, however, one may also describe the organization as a system which has characteristics analogous to systems at each of the lower levels in the hierarchy.

At the framework level, the organization is described as a system in such terms as:

-the organization chart and line/staff relationships;

-personnel lists and categorizations of staff members;

-plant and facility layout charts; and

-location maps of branch offices and representatives.

At the clockwork level, the organization is described as a system of predetermined, necessary motions and activities, including such descriptions as:

-functional descriptions of blocks on the organization chart;

-job descriptions for personnel;

-detailed motion studies of production tasks; and

-flow charts of men, money, and materials.

The next level, that of the thermostat, introduces the concept of control. Descriptions of the organization as a system at this level include such self-regulating mechanisms as:

-inventory control rules;

-financial and cash management rules and policies;

-hiring, firing, and promotion rules and policies; and

-other decision rules and policies.

These first three levels incorporate viewpoints of the organization which seem to be manifest in what has been called the "classical" (Scott, 1967, Chp. 5) or the "traditional" (Carzo and Yanouzas, 1967, Chp. 2) theory of organization. The concepts of "lines of authority" and "span of control" are reflections of the framework view of the organization. Taylor's concept of a functional organizational structure and his concern with scientifically designed work methods added the level of predetermined motions (clockwork) to the line/staff framework given by the usual organization chart. The third level, that of self-regulation, is reflected by Weber's ideal bureaucracy, in which

organizational activities are governed by impersonal, technically-based rules and regulations.

The fourth level of viewing the organization as a system is that of the cell, a self-maintaining, open system. The previous three levels have been essentially "closed" systems: static frameworks, predetermined motions, or simple regulatory mechanisms. As pointed out by von Bertalanffy (1950), the open system, because it has the capability of taking resources from the environment, can become more ordered with time. The reverse is true for closed systems. According to the second law of thermodynamics, irreversible processes contribute to increasing entropy, or increasing disorder, with time.

At the cell level, descriptions of the organization take the following forms:

- -a boundary circumscribing the system, defining what is "inside" and what is "outside";
- -descriptions of the "internal" (inside the boundary) environment and the "external" (outside the boundary) environment; and
- -descriptions of inputs taken from the external environment and of outputs provided to the external environment.

The next level, typified by the plant, emphasizes other characteristics of the organization as a system. The concept of equifinality becomes evident at this level, a reminder that an organization, like a plant, may reach the same state of growth and development through several alternative paths, as may be necessary by changes in the environment. Descriptions of the organization viewed at this level would include such concepts as:

- -the genetic heritage of the organization;

-the separate, differentiated (but mutually dependent) functional parts; and

-distinctions between genotype, phenotype, and individual.

At the next level, the animal level, descriptions of a system mobility, teleological behavior, and self-awareness. At this level, one is made aware of an organization's specialized information receptors, which greatly increase the amount of information taken in by the organization, resulting in fundamental changes in the bases for behavior: activities and behavior are increasingly governed by a knowledge structure (image) rather than by simple responses to stimuli. At this level, descriptions of an organization include such concepts as:

-purposes of the organization;

-information gathering and processing functional parts; and

-image (knowledge structure) of the external environment.

Levels 4 through 6, from the cell to the animal, include concepts which have parallels in "modern" organization theory (Scott, 1967, Chp. 6, and Haire, Ed., Modern Organization Theory, 1959). Output measures provide a basis for effectiveness definition and monitoring, and output/input measures provide the basis for efficiency calculations and comparisons. The concept of specialized parts, each contributing to the whole, supported Taylor's concept of the functional organization and the concept became more widely accepted after its initial cool reception. Concepts of differentiation (by specialization) and integration (by coordination), as described in the recent works of Lawrence and Lorsch (1967), refine the notions of specialized parts of an organic whole. The same authors distinguish among organizations according to

the types of environment in which they operate. These descriptions of the organization might be considered as characterizations of the organization in terms of genotype (belonging to, or a part of, a particular industry) and phenotype (having characteristics typical of similar organizations in similar localized environment).

Categorizations of an organization as to genotype and phenotype are not unique: depending on the similarities one wishes to stress, the classifications may be chosen differently in different situations, and an organization may "belong" to several categorizations. (For examples, see Blau and Scott (1962) and Etzioni (1964).) Another caveat is that the individuality of the organization may be the dominating factor in a particular situation, and any analysis should include the unique characteristics of the individual organization.

Other writers of modern organizational theory have used concepts that fall at these systems levels. Boulding (1956 b) developed generalized ideas of growth that have application to organizations; Haire (1959) found empirical parallels to principles of growth in organizations; and Scott (1967, Chp. 6) gives several examples of factors which influence the growth and form of an organization. Lippitt and Schmidt (1967) and Lippitt (1969) speak of stages of organizational development -- birth, youth, and maturity.

Bennis (1966) and others speak of the desirability for an organization to be adaptable to environmental changes. The organization should be able to modify goals and directions when they become infeasible or obsolete.

Another relatively recent organizational concept, related to the

concept of an adaptive organization, is that of the "organic" or "organismic" organization. In this form of organization, as discussed by Burns and Stalker (1961) and Haberstroh, et al. (1968), there is an emphasis on, and commitment to, the tasks and goals of the organization. Instead of the more formal organizational structures and rules found in non-organismic ("mechanistic") organizations, the organismic organization effects coordination and integration through continual interaction and adjustments and through communication of information and advice.

There remain two additional levels for viewing an organization as a system. At the human level, the descriptions of an organization emphasize the self-reflexive quality of the organization's image, the ability to produce, absorb, and interpret symbols, and the elaborate image of time and relationship. At this level, descriptions of the organization include such concepts as:

-means of communication with other organizations;

-identity and self-image;

-economic and societal roles;

-stages of development and changing needs; and

-expressive behavior.

At the next level, the social system, descriptions of the organization emphasize the fact that the organization consists of individuals in a social arrangement. The needs and motivations of the individual members of the organization and the groups which they form are important factors in explaining organizational behavior.

Bennis (1966) uses the human level to view the organization when he speaks of a "healthy organization" having a sense of identity and a

capability for perceiving the world and itself correctly. Yuchtman and Seashore (1967) suggest a similar concept in a systems model of an organization which would emphasize the identity of the organization and the interdependence of the organization with its environment.

Lippitt (1969) implies a parallel between the (individual) human need hierarchy of Maslow (1970) and the stages of development of an organization when he describes the mature organization as having the need for a kind of "corporate self-actualization," the highest need in Maslow's hierarchy.

The importance of viewing the organization as a social system became evident in the 1930's as researchers and theorists began to take into account the results of the Hawthorne experiments (Scott, 1967, p. 30). This viewpoint is evidenced by Argyris (1957, 1962, 1965) and Likert (1961), among others. Still later concepts combine the idea of a technical system with the view of the organization as a social system and consider the organization as being a "socio-technical" system embedded in a "surrounding environment" or in an "ecosystem" (Kast and Rozenzweig, 1970, Chp. 5; Davis, 1970; Morton, 1969).

Organizational Health

One ordinarily thinks of a healthy condition as a condition in which there is an absence of disease. This concept is reinforced by the definition of health in Webster's Seventh New Collegiate Dictionary (1969): "the condition of being sound in body, mind, or soul; esp.: Freedom from physical disease or pain." "Sound" is defined as "free from injury of disease: robust; free from flaw, defect, or decay."

In other words, the condition of health usually is defined as the freedom from disease, which in turn is defined as an impairment of the "normal state" of the living animal or plant that "affects the performance of the vital functions."

This definition does not adequately describe the active, positive aspects of health. One ordinarily considers a healthy individual not only to be free from disease and pain, but also to be actively interacting with his environment and generally to view the future with positive anticipation. In other words, the healthy individual is proactive as well as reactive.

Bennis (1966) suggests a definition for organizational health which helps convey the proactive and positive aspects of health. He defines a healthy organization as one which "actively masters his environment, exhibits a certain unit of personality, and is able to perceive the world and himself correctly." The parallel to individual health is apparent, and Bennis credits Jahoda's 1958 book on human mental health as the basis for the definition.

Bennis does not completely develop this concept of health, and extensions of the concept to consider several organizations which may be interacting presents difficulties. One dilemma is the "correctness" of an organizations' perception of reality: there is no assurance that another organization will have the same perception or will agree to the correctness of a single perception. Another dilemma is presented by two organizations, each of which is attempting to "master" its environment: "mastery" by one may be inconsistent with "mastery" by the other.

Bennis's healthy characteristics suggest an approach to health which would convey the proactive, positive aspects and could be operational. A general definition of a healthy condition is the preferred basis for this approach. This definition is that a healthy condition is one in which there is a continuing symbiotic, or mutually beneficial, relationship between the organism and its environment. For the organization, the definition may be restated as: a healthy organization is an organization which establishes and maintains a mutually beneficial relationship with its environment.

The characteristics of a relationship which is mutually beneficial to the organization and its environment may be deduced by viewing the organization at level seven in Boulding's hierarchy, the individual human level, just as Bennis did in assuming his definition of organizational health. At this level, the organization is clearly an individual system operating in a larger social system. The larger system consists of the organizations and individuals with whom the organization interacts and other organizations and individuals in the environment of the object organization.

Maslow (1970) suggested a hierarchy of needs which act as motivating factors for the healthy individual. According to Maslow, an individual first seeks to satisfy the lower needs in the hierarchy; when these needs have been met to an acceptable degree, the higher needs become motivators. The first needs in Maslow's hierarchy are physiological needs: the need for food, water, etc. Next are safety needs: the need for protection against predators and hostile individuals. If these basic needs are satisfied to an acceptable degree, they no longer

are critical concerns and the individual seeks satisfaction of the needs at the next level: belongingness and love, the need to feel a part of a group and the need to feel accepted and loved. The next need in the hierarchy is the need for esteem: the need to be respected and valued by others. The fifth and highest need in Maslow's hierarchy is the need for self-actualization: the need to become, in reality, all that one is capable of becoming -- the need to fully realize one's potential.

This heierarchy of needs implies a normative development sequence for a healthy individual which is similar to that suggested by Erikson (1968). Lippitt (1969) observes that organizations exhibit three stages of development, which he labels birth, youth, and maturity. These stages or organizational development and the critical organizational concerns of each stage parallel the need hierarchy of Maslow.

During the birth stage of an organization's development, the critical organizational concerns are analogous to the physiological needs of the individual (food, shelter, etc.): the organization must begin its existence and exchange resources with its environment in a manner that permits it to survive. For example, a for-profit organization's concerns include the legal establishment of the organization, the obtaining of resources to meet the payroll, etc. For a volunteer, non-profit organization, the concerns include the establishment of a purpose for the organization that is shared by enough people to permit the organization to continue, the exchange of personal talents and resources of the organization's members for personal need satisfaction, etc.

During the youth stage of development, the organization's needs

are analogous to the belongingness/love/esteem needs of the individual: the organization must achieve some stability in its relationship with its environment, it must earn a reputation among those with whom it interacts, and it must develop pride in its reputation. For the example of a for-profit organization, the development is manifest through steady sales/profit growth or improved services in particular markets, a deserved reputation for its product or service, etc. For the example of a volunteer organization, the development is manifest through continuing membership support, increased public awareness of the organization's activities, etc.

During the final stage of development, the organization's concerns are analogous to the individual need for self-actualization: the organization develops its own uniqueness, becomes adaptable to internal and external changes, continually discovers its capabilities and uses them to contribute to society. In this stage of development, the for-profit organization may provide new products or services to its environment, discover new markets it can serve, etc. The volunteer organization in this stage may recognize its real capability (for fund-raising for worthy causes, for example) and utilize this capability for new purposes, adapt new means of interacting with its environment to fulfill its potential capability, etc.

The stages of development and the correspondence between organizational concerns and individual needs are summarized in Table 1.

The concept of a normative sequence of development for a healthy organization permits a restatement of the definition of a healthy organization in a more prescriptive form:

Table 1. Organizational Development and Maslow's Need Hierarchy

Organizational Stage of Development (Lippitt, 1969)	Critical Organizational Concern (Lippitt, 1969)	Individual Need (Maslow, 1954)
Birth	Create Organization	Physiological Needs
	Survival	Safety Needs
Youth	Gain Stability and Reputation	Belongingness and Love Needs
	Develop Pride	Esteem Needs
Maturity	Achieve Uniqueness and Adaptability	Need for Self-Actualization
	Contribute to Society	(Cf. Erikson, 1968, p. 94)

> a healthy organization establishes and maintains a relationship with its environment which enables it and those with whom it interacts each to progress toward the full realization of its potential.

Using this definition and Table 1 as guides, one may infer a set of characteristics which a healthy organization may exhibit. To progress toward the higher stages of development and to fully realize its potential, an organization must both (1) meet the challenge of the critical concerns of the present stage of development, and (2) be prepared to meet the challenge of the critical concerns of the next stage of development. In other words, the strategic decisions at each stage must not lead to a "trapping" state, a stage of development from which the organization can progress no further. Thus in the birth stage, the strategic decisions must satisfy the concerns of creation and survival and, in addition, the decisions at this stage must prepare the organization for meeting the concerns of stability, reputation, and pride. Similar considerations hold for the youth and maturity stages of development.

Table 2 lists sets of characteristics which were composed by considering the following questions: What characteristics would help satisfy the organizational need at the particular stage of development? What information or capability is needed to help satisfy the concern at the next succeeding stage of development? What aspects of the organization's <u>image</u> of itself and its environment might need to be examined in order for the organization to continue its development?

More detailed sets of characteristics are identified in Tables 3a, 3b, and 3c. These tables illustrate characteristics formulated by considering the above questions at each system level of an organization.

Table 2. Characteristics of a Healthy Organization at Different Stages of Development

Stage of Development	Characteristics
Birth	-Existence of purpose for organization -Commitment to fulfilling purpose -Adequate input/output balance -Capability to obtain resources -Awareness of potential improvements in internal operations
Youth	-Increasing efficiency -Internal specialization and coordination -Well-defined interactions with the environment -Understanding of organizations' history -Awareness of need for flexibility and of the likelihood of external change -High morale
Maturity	-Well-defined, potentially flexible self-image -Capability for continuing self-examination -Capability to anticipate impact of actions on environment

Table 3. Systems Levels Characteristics of Healthy Organization - (a) Birth Stage

Level	Satisfaction of Current Needs	Toward Satisfaction of Future Needs
1. Framework	Formal framework exists in some form, but is flexible and responsive to changing needs	Form is developed which permits growth and specialization
2. Clockwork	No unchangeable procedures are established, but effects of choices of procedures are recognized; information adequate for resource decisions of thermostat level is generated regularly	Flows and procedures are established which are adequate for work load
3. Thermostat	Decision rules and policies maintain adequate resource levels	Decisions and policies generate resource levels that permit growth
4. Cell	Boundary is distinguishable; actual and potential inputs and outputs are visible	Inputs can be increased to permit growth
5. Plant	A source of committed resources is available	Capability to develop specialized parts, recognition of the model provided by organization's heritage
6. Animal	Purpose and adaptable goals exist	Capability to develop specialized information receptors and processors
7. Human	Contacts and communication with other organizations shape and modify role; development takes place	Development of articulation of desired role(s); capability of efficient communication with other organizations
8. Social	Shared understanding and commitment to purpose	Shared understanding and commitment to goals

Table 3. (Continued)

(b) Youth Stage

Level	Satisfaction of Current Needs	Toward Satisfaction of Future Needs
1. Framework	Formal framework exists which permits growth and specialization	Formal organization is not fixed
2. Clockwork	Established flows and procedures exist and are not overloaded; increases in workload are possible	Procedures are set up to exchange information with environment; new procedures can be established
3. Thermostat	Decisions and policies control resources levels so that growth is possible but extreme levels are not allowed	Consideration of the impacts outside the organization become part of feedback
4. Cell	Boundary is distinct and changes are clearly delineated; growth in output is evident and input/output measures are distinct	Exchanges with environment become balanced; output/input relationships may be unique
5. Plant	Specialized parts in keeping with heritage and local environment develop and function	Capability to create new specialized parts and eliminate non-functional parts
6. Animal	Well-developed information gathering and information processing is established part of organization	Capability to develop knowledge structure of external environment
7. Human	Well-defined self-image; established and accepted societal role is being fulfilled; efficient and effective communications with other organizations	Alternative roles and possibilities of expressive behavior recognized
8. Social	High morale; high trust levels; shared pride in, and understanding and commitment to, organizational goals	Increasing shared recognition of societal role or organization

Table 3. (Concluded)

(c) Maturity Stage

Level	Satisfaction of Current and Future Needs
1. Framework	Well-defined framework that can be modified
2. Clockwork	Regular procedures for flows of material and information; a procedure for establishing new procedures and modifying existing procedures and flows
3. Thermostat	Feedback from environment and self-examinations are inputs to policy and decision-making on regular, well-defined basis
4. Cell	Input/output relationship which is unique to organization; balanced exchanges with environment; inputs balance outputs
5. Plant	New specialized parts are created as new functions are desired; nonfunctional/nonessential parts do not continue to exist
6. Animal	Well-developed knowledge structure of external environment; impact of actions or activities can be anticipated
7. Human	Self-image is well defined and is subject to continual examination; alternative roles are perceived, clear choices recognized, and choices made; expressive behavior exists; activites affecting other organizations do not prevent, and may aid, the development of these organizations
8. Social	Shared understanding and commitment to societal role of organization; tensions and mutual respect create an environment for individual self-fulfillment

Results

The above concepts of systems levels and organizational health include perspectives which provide insight into those questions with which strategic planning is concerned. The key perspectives and concerns are summarized below.

Viewing the Organization as a System at 8 Levels

The eight categories in Boulding's hierarchy used as levels for viewing the organization provide a comprehensive framework for describing the organization as a system. The eight levels are collectively exhaustive; that is, taken together, the eight levels encompass all types of descriptions of the organization as a system. Viewing the organization as a system at each level adds a second dimension (the different levels) to other comprehensive descriptions of the organization (e.g., a complete, detailed organization chart). This added dimension helps suggest possible or desired changes in the status quo and it helps establish the overall desirability of a potential change.

For example, consider describing a particular university as a system at several of the levels in sequence. At the human level, one of the university's principal roles in its environment might be that of "educator and trainer of professionals." As a possible change in its role, the university might consider adding emphasis to its role of "continuing educator, retrainer." Exploring this potential change at the cell (input/output) level suggests that an emphasis on continuing education and retraining would be accompanied by changes in inputs to the university: older, more mature students might be entering the university, and the source of tuition financing would not necessarily

be from the students' parents. Viewing the university at the social system level, this change might result in the older and more mature students entering into a different relationship with the professors, creating a new system which could help shape new forms of education. Carrying this potential change back to the human level suggests that another possible role of the university, a role in which "new associations of people are brought together to help solve problems," would be a compatible role with "continuing educator, retrainer."

In addition to helping identify additional alternatives, as shown above, the eight systems levels can be used as an aid in investigating the effect of a potential change at one level on the system at other levels. In the above example, changed emphases in the university's roles might necessitate changes in the university framework (e.g., different housing facilities, new or modified organization chart, etc.) changes at the clockwork and thermostat levels (e.g., modifications in registration, grading, grade-reporting procedures and admission policies), changes at the cell level (e.g., interfaces with different kinds of alumni and other groups and different sources of funds), and so on at each level. The net value or desirability of the proposed change may be assessed by considering and weighing the relative desirabilities of the accompanying changes at other levels. In the university situation, for example, the increasing emphasis on retraining might have the net effect of reducing the total financial input from conventional sources: parents' and alumni donations, federal aid to students, etc. If alternative sources of income were not available and the university's financial commitments could not be reduced, the net effect of the potential

new emphasis might be undesirable. If the income from conventional sources is reduced but the net effect is desirable, then a strategy for pursuing the goal of increased emphasis on the role of "retrainer, continuing educator" likely would make provisions for alternative income sources.

Using the Human Level as Focus for Strategic Concerns

The human level descriptions of an organization proved a compact way to summarize complex activities of an organization. Descriptions at this level take the form of overall behavioral characteristics, societal roles, self-image, and communication behavior with other organizations and individuals in the environment. This is done for much the same reasons one describes a human individual in these terms rather than in terms of detailed physical movements, time varying or spectral content of speech, or electrochemical changes taking place in the nervous system: it conveys much information without extensive detail. In the university example, the complex multitude of descriptions of course offerings, student recruitment activities, curriculum design, etc., are summarized through the proposed emphasis on the role of "continuing educator, retrainer."

The human level views of the organization include the concept of stages of development, a concept which stimulates considerations of the future. Moreover, these considerations of the future include a proactive as well as reactive bias. That is, the future is viewed as being shaped by the simultaneous actions both of outside, noncontrollable forces (e.g., activities by other organizations) and of one's own acts of will and determination; there is an awareness both of constraints and

limitations on one's actions and of the capability and responsibility for making choices which affect the future.

Organizational Health

The adoption of the definition of organizational health discussed above establishes a norm for organizational change. The normative stages of development of an organization provide a standard by which to measure the desirability of a potential change. A proposed change which has an anticipated overall effect of helping to complete the current stage of development or of helping to move to the next stage of development is desirable; a proposed change which does not have this anticipated effect, or which has an anticipated overall effect of preventing further development, is not desirable.

This definition of organizational health also establishes a scope for strategic planning which goes beyond the boundaries and immediate concerns of the organization itself. The strategic planning process must address itself to a system whose boundaries include not only the organization, but also the organizations and individuals with whom the organization interacts. Viewing the organization at the human level, the scope of strategic planning is the "social system" of which the organization is a part. This means that the organization must be able to communicate with other parts of the system in order to maintain an awareness of their concerns, stages of development, capabilities, etc.

In the case of a university, to continue the example hypothesized above, the university's health is inseparably tied to the future health of organizations and individuals in the environment of the university: the economic health of the immediately surrounding community, the future

of the groups the university serves, the organizations which interact with the university and depend to some extent on its business, etc. In this example, setting the scope of the strategic planning concerns of the university to include other parts of the system in which the university is embedded is perhaps easier to understand by noticing the parallel with strategic planning for a department of the university. The health of the department, and thus strategic planning for the department, cannot be considered independently of the health of the entire university; the scope of the system extends beyond a single department and includes other departments and other groups within the university. In the same way, although the system and the linkages among its parts are not so evident, strategic planning for the university involves the system which includes the organizations which interact with the university.

Application of Concepts to Strategic Planning

The perspectives and concerns identified in the above sections may be applied to the sequence of planning steps identified in Chapter II in order to develop a more detailed general procedure for organizational strategic planning. This application is described in the following chapter.

CHAPTER IV

A REFINED GENERAL MODEL FOR STRATEGIC PLANNING

Scope

This chapter describes a general model for organizational strategic planning which is more detailed than the model abstracted from the planning literature and presented in Chapter II as a sequence of steps. The more detailed model is based on a synthesis of the sequence of steps with the concepts of systems levels and organizational health. The chapter describes the development and design of the more detailed model through flow diagrams and text. The overall procedure is described and the procedure at each step is outlined. Examples from hypothesized situations are included to help clarify the steps. The chapter includes a summary of the potential advantages of the synthesized, more detailed model over the model based solely on the planning literature.

Development of the Refined Model

The design of the more detailed model is presented in Figure 1 (two parts) and in the text below. The design is developed by reconsidering the sequence of planning steps presented in Chapter II from the perspectives of the concepts of health and systems levels. This approach yields a more detailed model through the division of some steps into separate steps and through the creation of additional detail at each step. As diagrammed in parts 1 and 2, this additional detail becomes

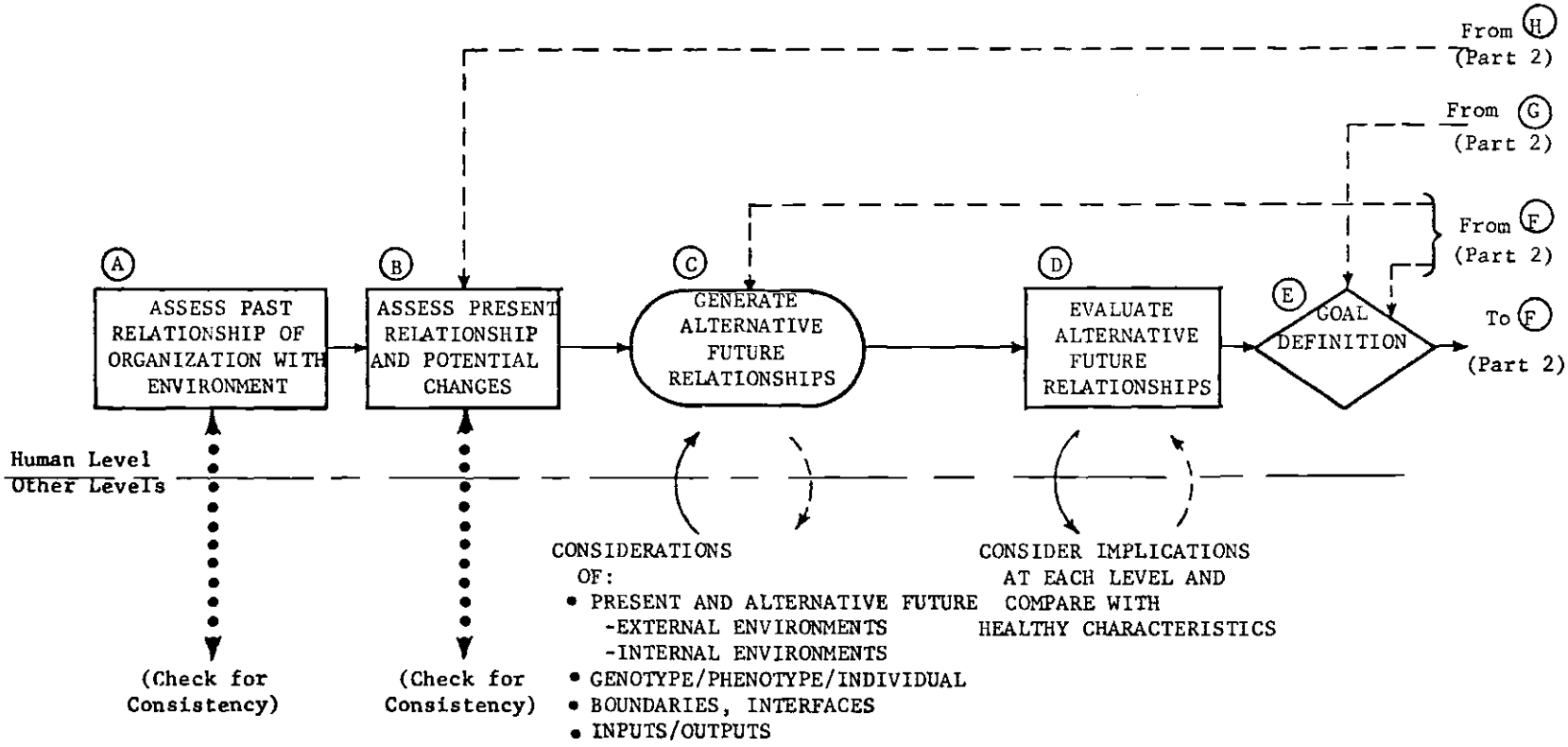


Figure 1. Process Model for Strategic Planning.

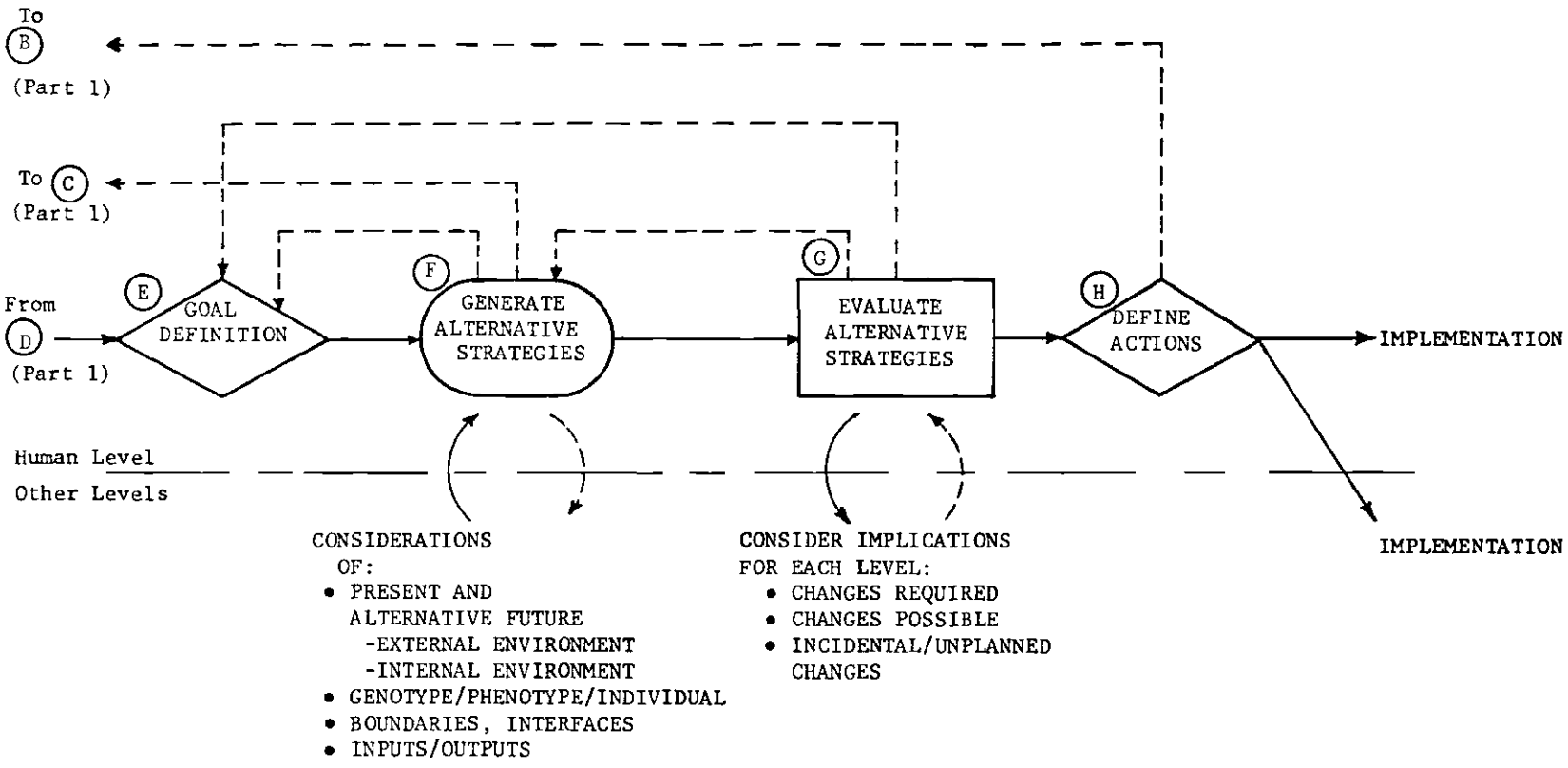


Figure 1. (Concluded).

a second dimension (consisting of secondary sequences or subroutines) to the initial dimension, the primary sequence of generation, evaluation, and decision steps. The following text describes the model in terms of the primary steps and the activities at each step. The sub-headings correspond to the steps in the planning sequence outlined in Chapter II.

Evaluate the Present Situation

This step in the process appears in Figure 1 as two steps: step A, an assessment of the organization's past, and step B, an assessment of the present relationship of the organization with its environment. These assessments are made in terms of the human level descriptions of the organization; descriptions at the other levels are used to verify the human level descriptions and assessments.

The step of assessing the past relationship of the organization with its environment provides an "open loop" beginning step or a "re-start" step. The remaining steps in the process may be affected by feedback from other steps; they form a continuous "closed loop" process.

Assessing the past relationship of the organization with its environment results in a brief history of the organization from the time of its beginning up to the present time. This history does not go into great detail but does include the cause, reason, or enabling factor which originally established the organization. As examples: a government agency is established by legislative act; another government agency is created by executive order; a university begins from the efforts of one man with a vision he wants to realize; a non-profit flying club is organized by a group of WWII veterans who want to continue to fly at low cost; a consulting company begins when an entrepreneur sees the need

for a technical service and the opportunity to make a profit by providing this service. The history provides an overview of how the original purpose has been fulfilled over time and how it has been modified in the period between the beginning and the present. This time-dependent picture also includes the growth characteristics of the organization: size, number of people or organizations served, size of budget, sales, profits and profitability, etc.

While the history of the organization provides a "moving picture" of the past relationship of the organization with its environment, the assessment of the present situation is a "still picture" or "snapshot" of the present relationship of the organization with its environment. This snapshot represents a summary of all the current activities of the organization: the current role (or roles) of the organization, the image the organization uses to anticipate events and the self-image which the organization uses to help determine what alternatives are appropriate, the current communication links with other organizations, etc.

The assessment of the present situation also results in an awareness of potential changes in the relationship of the organization with its environment. It is at this step, for example, that a university might recognize the possibility of an increased emphasis on the retraining role; that a government agency may recognize a new means of serving its clients; that a non-profit club might recognize additional services it can offer its members; or that a consulting company may recognize new markets for its services or new ways of communicating with its clients.

In assessing the past and present relationships of the organization with its environment, the first six levels (framework through animal levels) corroborate the human level assessments by providing "pictures" from different angles and having different perspectives. For example, detailed descriptions of sources of students and destinations of graduates would provide added insight into the actual role fulfilled by the university.

The step of assessing the present relationship and potential changes, in addition to being a logical step to follow the history of the organization, has an input of feedback from the final decision step in planning.

Except for the singular case of a newly-initiated or restarted strategic planning process, the evaluation of the present relationship includes a comparison of the present state with the anticipated results of the actions selected in step H. If the situation after plans have been implemented has not changed in the manner anticipated, the new goals or strategies may be appropriate.

Identify Alternative Future States

This is a creative/generation step, distinguished by using an oval outline and labeled as step C in Figure 1. The output of this step is a list of alternative possible future states of the organization (alternative future relationships of the organization with its environment). The primary input to this step, the output of step B, is the assessment of the present relationship. The dissatisfactions stimulated by this assessment provide the basis for generating alternatives.

The mechanism to generate the alternatives may take one of many

forms, depending on the size of the organization, the resources available, the management style, etc.

One method is brainstorming, where a group would assume the task of generating (but not the task of evaluating) a list of alternatives. Another approach is the application of forecasting techniques toward a nontypical objective: rather than a prediction of what is likely to occur, the desired product is a list of what might be possible. Whatever the mechanism, an initial list of possible changes in the present state (and thus a list of alternative future states) is generated by concentrating on any system level description of the organization. Forecasting/future techniques may be used, for example, to identify alternative future internal and external environments, alternative inputs and outputs, alternative boundaries and interfaces, etc.

Alternatives for the individual organization also may be generated by surveying other existing organizations in the same genotype and phenotype or by applying forecasting techniques to identify a general set of alternatives for the genotype or phenotype.

In the case of an individual university, for example, an initial list of alternative relationships might be identified by one or a combination of the following methods: extrapolate input and output trends and summarize these in terms of roles of the university; identify existing boundaries and interfaces, modify these in some rational manner, and summarize the results in terms of roles or some other human level description of the university; survey other universities; particularly those universities existing in similar communities and having similar circumstances, and list alternative roles which these universities

fulfill or have fulfilled; use brainstorming or any other potential aid to creativity to generate a list of alternative roles.

Once the initial list is generated, the other systems levels and the information which is available about these levels help generate additional alternatives and help detect compatible or synergistic roles. The eight systems levels are used in check list fashion to consider the implications of each alternative role at each level and to consider the implications of information from a given level at each of the other levels.

The example of the university given at the beginning of the above section demonstrates how additional alternatives and combinations may be generated through the use of the eight systems levels: the alternative of "continuing educator, retrainer," if assumed as a newly emphasized role, may enter the university; other changes may take place at the clockwork and thermostat levels -- improvements in educational technology may produce teaching machines which result in new roles for professors (a change at the social system level); these new roles for professors, coupled with the input of older, more mature students into the system, may result in a much different social system; the new social system provides an opportunity for new forms of education and research; an alternative role, the university acting to "bring new associations and groups of people together to solve problems," is more likely to be possible with the new social system. In this example, using the eight levels in check list fashion reveals an association between two alternative roles which otherwise might not be noticed.

Step C includes the input of information feedback from step F,

the "generation of strategies" step. This feedback path is shown to illustrate that the generation of alternative means of pursuing a goal may suggest additional alternative relationships.

Evaluate the Alternative Goals and Select the One(s) Desired

This step appears as two steps in Figure 1. Step D is shown as an analysis step (a rectangular outline); step E is the decision step, diagrammed with a diamond outline. (In order to more easily relate the two parts of Figure 1, step E is included in both.)

In step D, the alternative relationships are evaluated by comparing the anticipated results of achieving a particular relationship with the anticipated results of achieving some other particular relationship, and with the characteristics of a healthy organization. Making these comparisons is accomplished by using the eight system levels. In this step, however, each system level is used to provide a different description of the anticipated results of achieving the proposed relationship. In the university example discussed above, the proposed emphasis on the role of retrainer and continuing educator would likely be achieved in conjunction with changes at other system levels: changes in facilities, policies, interfaces, etc. Some of the changes may be necessary to achieve the proposed relationship; regardless of the order and causality of the changes, the resulting state of the system is described collectively by the descriptions at the eight levels.

The comparison of the anticipated results of achieving the proposed relationship with the characteristics of a healthy organization takes into account the current stage of development of the organization.

As shown in Table 2, as the stage of organizational development changes, different characteristics are emphasized for a healthy organization.

The goal definition, step E, is a decision which makes explicit the selection of one (or a combination) of the alternative relationships as being at least as desirable as, or more desirable than, all other relationships or combinations of relationships. This decision, ultimately a matter of judgement, is made upon the basis of the outcome of the comparative evaluation in step E. The decision is not absolute; the goal may be redefined or restated as a result of information feedback from steps F and G, the generation and evaluation of alternative strategies.

Identify Alternative Means of Pursuing the Chosen Goal

Step F in Figure 1 is the second creative/generation step. The output of this step is a list of alternative strategies, or methods, by which the chosen relationship can be pursued. As in the first creative step (step C), many mechanisms will aid in the development of a list of alternatives, and this list may be expended and refined by utilizing descriptions at each of the eight systems levels.

In this step, however, the approaches such as brainstorming and forecasting are combined, perhaps implicitly, with assumed cause-and-effect relationships by which the proposed strategy is presumed to lead toward the chosen relationship. In other words, each alternative strategy is presumed to lead toward the desired goal. As in the previous creative step, imaginative strategies may be stimulated through remote associations identified by using the eight systems levels as a check list of possible implications of a particular strategy.

The list of alternative strategies and the information produced by generating this list is fed back to two previous steps: the generation of alternative relationships and the goal definition steps. The list of alternative relationships is reviewed in the light of the strategy information, and this review may suggest additional feasible relationships or combinations of relationships. The defined goal also is reviewed; the strategy information may suggest modifications or even substantial changes to the statement of the desired relationship.

Evaluate the Alternative Strategies and Select the One(s) Most Desirable

This step in the process is diagrammed in Figure 1 as two steps: step G, the evaluation of the alternative strategies (analysis) and step H, the definition of actions (decision).

In step G, each alternative strategy is evaluated by first assuming that the strategy is adopted, then (1) estimating its impacts and results at each systems level, (2) identifying the events and changes which are required for the strategy to be successful -- i.e., for it to lead to the desired relationship -- and estimating the likelihood of these events and the cost of inducing these changes, and finally (3) comparing the expected impacts and results with the desired relationship (defined goal) and with characteristics of healthy organizations.

As in step D, the systems levels provide a framework for analysis which helps assure a comprehensive examination of each alternative. As a result of the analysis, information may be generated which would suggest modifications or additions to the list of alternative strategies and modifications to the defined goal. Therefore, feedback paths are shown from step G to steps E and F.

The final step in the planning process is the decision step in which a strategy or combination of strategies is selected from the list of alternatives and specific actions are defined for implementing the strategy. This judgement is aided by the evaluation in the previous step, and the decision outcome is fed back to step B to provide a continuing comparison between the expected or anticipated actions and results and the actual results and actual situation as these change with time. This feedback path, from step H to step B, closes the loop for the overall planning process; its existence assures that the process of strategic planning continues rather than being simply an episodic or "one-shot" process.

The implementation of the actions which are defined in this step may involve all eight systems levels: restructured organization chart and physical plant modifications, different inputs/outputs, new organizational self-image, modified social system, etc. The implementation, though not normally considered within the scope of planning, affects the organization's present state. Therefore, the effects of implementation, as evidenced through the evaluation of the present situation, are included within the planning process.

Potential Advantages of Refined Model

The design of the refined model for strategic organizational planning is based on a synthesis of (1) a sequence of steps abstracted from the planning literature and (2) the concepts of systems levels and health. This synthesis results in a planning model which is consistent with the general prescriptions for planning in the literature

but which has several apparent advantages over the model represented by the sequence of planning steps. These advantages are discussed below.

Information Needs and Communications

The model places information requirements on an organization as a requisite for strategic planning. The organization needs to have available or to develop information about (1) how it has interchanged resources and interacted with its environment and (2) alternative means of interacting and interfacing with its environment. This information is necessary for the organization to make strategic decisions, and the refined model identifies the needs and provides a structure for the collection of information to satisfy these needs.

Related to the need for strategic planning information is the need for communicating about planning. The refined model provides a common language and an intuitive organizational metaphor on which to base discussions about organizational goals and strategies. Individuals with different training and backgrounds, such as middle managers, chief executives, management scientists, financial analysts, etc., may each make valuable contributions to strategic planning if there is the opportunity for communication without language and conceptual barriers.

Additional Dimension to Planning

The refined model does not replace other approaches and techniques which aid in planning and decision-making. Instead, it provides an added dimension to their use by supplying a necessary conceptual perspective. The model compacts the fundamentals of planning into an overall systems framework within which particular dissatisfactions or

perceived opportunities may be examined and particular methods and techniques (e.g., technological forecasting, financial analysis, etc.) may be applied.

Procedural Guidance

The refined model maintains the generality of the "sequence of steps" model abstracted from the planning literature, providing a general procedure for conducting planning, but it supplies additional guidance on the execution of the steps in the procedure. The concepts of systems levels and health provide check lists of aspects of the organization which can aid in the generation and evaluation of alternative relationships and strategies. These check lists can be used to design detailed procedures for each step in the primary planning sequence.

The next chapter illustrates the application of this additional guidance in the further definition of the step of generating alternative relationships of the organization with its environment (i.e., alternative goals). The chapter describes the design of a procedure for conducting this step. The concepts of levels and health are used to aid in evaluating the adequacy of the output of the step and in a preliminary evaluation of the alternative relationships.

CHAPTER V

A PROCEDURE FOR THE GENERATION OF ALTERNATIVES

Scope

This chapter describes the design of a procedure for generating strategic alternatives for an organization. The procedure utilizes the techniques of futures studies and the concepts of organizational health and systems levels to yield alternative possible future states and to identify remotely associated alternatives.

The chapter includes the definition of an overall structure of the procedure, a description of how the procedure is executed, and the illustration of aspects of the procedure by examples of applications. The chapter includes the description of the use of the concepts of organizational health in a preliminary evaluation of alternatives, but the description of detailed evaluation of alternatives is excluded from the scope of the chapter. A complete example of applying the procedure for the generation of alternatives for the University is described in the next chapter (Chapter VI).

Context

The procedure described in this chapter is one step in a process of organizational strategic planning. The overall planning process is a continuing process of evaluation, analysis, and decision-making. This step in the process is a creative step; the output is a list of possible states, each of which may describe the organization and its relationship to the environment at some time in the future. Because they are currently

unachieved states, the alternative future states represent imagined situations which are considered possible. Because the planning process is a continuing process, the list of alternatives resulting from the generation procedure need not be exhaustive; additional alternatives may be added to the list over time.

The planning process is a general approach to organizational strategic planning flexible enough to be applied in different organizational structures and to be executed through different management styles. The procedure for the generation of alternatives described in this chapter exists in the same context of generality and flexibility; it is a procedure capable of being implemented in organizations having different purposes, structures, and management styles.

Method

Applicable Concepts

The design of the procedure for generating alternatives utilizes concepts from the literature of several areas, including creativity, systems and functional analysis, futures studies and forecasting, and organizational health. These concepts help define the requirements and preferred structure and actions of the design.

The task of generating alternatives requires the application of imagination, therefore the literature on creativity, the creative process, and models of the mental process of problem-solving are applicable. One aspect of accomplishing a creative task is the recognition of remotely associated facts and ideas, and the concept of systems levels of an organization, developed in Chapter III, assists in recognizing these

remote associations among organizational alternatives. Helpful concepts on defining the steps in completing the task also are suggested by models of the process of problem-solving found in the literature on the systems approach and functional analysis. Futures studies techniques, particularly forecasting techniques, are used in the actual steps of identifying alternative future states for the organization and its environment.

Rationale

A procedure for generating alternatives requires a basic structure which identifies activities and a description of how to conduct these activities. The basic structure is necessary in order to identify the actions to be taken and the sequence in which these actions are to be taken. The structure provides a necessary framework in which to conduct the activities and establish a perspective which relates the activities one to another.

The procedure describes how to conduct the activities identified by the structure. The description provides enough detailed information to permit efficient execution of the procedure but not so much detail that the generality of the procedure is constrained and not so much detail that the creativity of the individuals or groups conducting the activities is inhibited.

Structure and Method Overview

The structure is defined as a sequence of steps, or actions, which use the information from the previous steps in the planning process and the concepts of futures studies, organizational levels, and organizational health to produce a list of alternatives for the

organization.

Following the basic model of the systems approach described by Hall (1962), the first task is to recognize and define the problem. For this overall task of identifying alternatives, recognition of the possibility of alternatives to continuation of the current state is assumed, since the overall task is a part of the planning process. The definition of the problem is accomplished by (1) identifying the scope of the organization and its environment, thus helping to specify the scope of the task of generating alternatives, and (2) identifying the strategic issues in the current situation which need to be resolved, thus providing a measure for assessing the adequacy of the list of alternatives generated by the procedure. The literature on creativity (e.g., Parnes, 1967) and literature on the systems approach and functional analysis (e.g., Hall, 1962, and Talavage, 1969 and 1971) both emphasize the importance of defining the problem in broad, general terms as opposed to narrow, specific terms. The latter seems to constrain the imagination, and the former seems to encourage the identification of creative approaches. Therefore, the identification of the scope of the organization and its environment and the identification of strategic issues should be in broad terms (e.g., human level descriptions rather than clockwork descriptions) which permit flexible descriptions of the situation and alternatives.

The next task is the recognition and identification of alternatives. The literature on creativity (e.g., Mednick, 1962, and Parnes, 1967) and the systems approach (e.g., Hall, 1962, Talavage, 1969 and 1971) suggest that capabilities useful for creative tasks such as this

one include (1) a sensitivity to problems and to the possibilities for change, (2) flexibility in formulating or describing a problem -- the capability of viewing a situation from many perspectives, and (3) the capability to associate previously remote facts and ideas.

Because there is evidence that being "uncreative" results from a disinclination rather than from a lack of ability (see Parnes, 1967, p. 56), this task is structured as three separate steps in order to help stimulate and foster the use of creative capabilities. First, alternative future contexts or environments of the organization are identified. This step directs attention outside the organization, toward societal, technical, and other factors over which the organization may have little or no control. It thus widens the horizons of the organization or procedure participants, forces them to make explicit their assumptions about the environment, and encourages consideration of how outside factors, trends, and developments affect the future of the organization.

Next, alternative relationships of the organization with its environment are identified. These alternative relationships may be as specific as alternative inputs and outputs, or they may be identified as alternative roles at the human level. This step helps define possible interactions between the organization and its environment and emphasizes that the scope of strategic planning is focused on these interactions and their impact on the organization's future development.

The final step in the task of recognizing and identifying alternatives is the examination of the relationships identified above

for remote associations. This step provides a specific opportunity to exercise the third capability identified by the creative literature, that is, the capability to associate previously remote facts and ideas. This step forces the reexamination of the alternatives already identified and provides the opportunity to recognize additional alternatives (e.g., through the merging or modification of alternatives) and synergistic combinations of alternatives. The result of this step is a list of possible future relationships, each representing a potential goal for the organization.

The final task in the procedure is the preliminary evaluation of the list of alternatives. This task completes the structure and provides a check on the adequacy of the list for helping resolve the critical strategic issues identified in the diagnosis task. This task establishes a basic closed-loop, or feedback structure for the generation of alternatives by comparing the implications of output list with the measure of effectiveness defined by the initial problem definition task.

The overall structure of the procedure may be summarized by the following sequence of steps:

1. Define the scope of the organization and its environment;
2. Diagnose critical strategic issues;
3. Identify alternative future contexts/environments of the organization;
4. Identify alternative future relationships of the organization with its environment;
5. Examine alternative relationships for synergistic combinations and related,but new,alternatives; and
6. Compare the list of alternatives with the initial diagnosis of critical strategic issues.

Steps 1 and 2 may simply make explicit what is implied by the results of the previous planning steps, and step 1 is the usual first step in the systems approach to any indeterminate situation. Step 2 utilizes the concept of organizational health and is a unique aspect of the alternative generation procedure.

Steps 3 and 4 represent relatively straightforward application of future studies techniques; little new material is represented by these steps.

The concept of systems levels is the basis for step 5, which represents an explicit application of the concepts of the earlier chapters in order to assist in the creative task of making remote associations among facts and ideas.

Step 6 is based on the concept of health and the identification of "healthy characteristics" at the different systems levels of an organization. Because this step and steps 2 and 5 represent applications of new concepts, the discussion below concentrates on these steps.

Procedure Description

Define Scope. Two scopes are defined. The scope of the organization is defined by viewing the organization as a system at the cell level and identifying the organizational boundary. The scope of the alternative generating procedure is defined by viewing the organization at the human level and defining the social system in which the organization as an individual is active.

The organizational boundary establishes what is inside and what is outside the organization, and this distinction defines the scope of the organization for which alternatives are to be generated. For example,

the generation of alternatives for a division of a multi-division corporation would not result in the same list as the generation of alternatives for the corporate staff organization of the same multi-division corporation or the same list as the generation of alternatives for the entire corporation. The alternatives are different because the organizations, having different boundaries, have different ranges of behavior from which to choose. The ranges of behavior are different both from the standpoint of the behavior descriptions and from the standpoint of the variables or options over which the organization has control. As examples, a single division of a corporation may describe its alternatives in terms of new products, additional market penetration, etc., while the corporate alternatives may be described in terms of acquisitions, mergers, etc. The single division ordinarily would not have the opportunity to consider the alternative of its being purchased by another company or of its being phased out of existence, although both alternatives would be within the range of actions by the corporation.

The scope of the alternative generating procedure is identified through the scope of the organization and the range and nature of its relationship with its environment. The procedure includes information about the organization, the interfaces of the organization with its environment, and other organizations which may be affected by the actions of the organization.

The principle of organizational health links the actions and potential actions of an organization to the activities of other organizations with which it interacts. The scope of the procedure to generate

alternatives for an organization therefore includes not only organizations which interface with it, but also other organizations which interface with them. For example, the generation of alternatives for a consulting firm would include information on the firm's clients and also information about their clients; the consulting firm serves its client organizations so that they, in turn, may better serve their respective clients. As another example, the generation of alternatives for a university would include information on the university students and also information on the organizations with which the students become involved after graduation. The alternatives reflect the needs of the students (one of the immediate "clients" of the university) and also the needs of industry (which, in one sense, is a "client" of a subset of university graduates).

The definitions of the scope of the organization and the scope of the alternative generation procedure establish bounds on the remaining steps.

Diagnose Issues. The diagnosis of critical strategic issues is a judgement based on the consideration of the history and present situation of the organization. The concept of stages of development aids in making this judgement, and the descriptions of the current state of the organization from each of the systems levels provide additional information which may be summarized by judging the organization to be at a particular stage of development.

The system level characteristics of healthy organizations (Tables 3A, 3B, and 3C) provide a comprehensive checklist of potential strategic issues. If the organization is not satisfying current needs

or is not developing capabilities to satisfy future needs, then these items are critical issues to be resolved by strategic planning.

The organization's current state is examined at each of the eight systems levels and the characteristics of the current state are compared with the characteristics identified as healthy. The diagnosis summarizes the current state by identifying the organization's current stage of development, that is, by describing the current human level characteristics of the organization. Descriptions at the other systems levels help complete the diagnosis and form the basis for anticipating the characteristics which future alternatives may imply.

For example, examination of a small restaurant might indicate the following: It is a recently organized business as a corporation with three owners. Each owner is committed to assuring the success of the business and definite goals have been verbalized. Although each owner has cash reserves, the business is requiring more investment than originally anticipated. There is apparent disorder in the operation of the food service: customers often complain about orders getting lost and mixed, and menu items are often unavailable. The diagnosis might describe the organization as an organization which is at the birth stage, about to make the transition to the youth stage. It has some characteristics which are healthy at the levels of framework, cell, plant, animal, and social levels, but lacks other healthy characteristics at the clockwork, thermostat, and human levels. Future alternatives may be expected to respond to the need for healthy characteristics at these levels. In particular, details of the alternatives may include the following: work flows and procedures designed or refined so that

customer service is improved; cost accounting and cash flow projection procedures established which provide periodic and timely information for anticipating cash needs and for identifying when corrective action is needed to control costs; and regular contact and improved communication with other organizations, particularly food suppliers.

Identify future environments and relationships. The third and fourth steps in the procedure utilize the same techniques, the techniques of futures studies, and these steps may be combined into a single activity and conducted together.

The output of step 3 is a description of one or more possible future environments in which the organization may operate. The set of possible environments includes all environments which have reasonable expectations of actually developing during the time period of interest. The output of step 4 is an initial list of alternative relationships between the organization and its environment which may be realized some time in the future. These relationships represent strategic alternatives for the organization, an initial list of alternative goals from which one or a combination may be selected as the desired future state of the organization.

Futures techniques and their applications are covered extensively by the literature (see Chapter II), and they may be applied with the objective of identifying alternatives.

For example, a publishing firm with a large college textbook business might conduct a Delphi study to identify strategic alternatives. The scope of the study would include anticipating advances in the technology of printing, identifying alternative future needs of the

colleges and universities served by the firm, advances in educational technology and teaching techniques, etc.

The study might identify alternative environments in which the firm would be operating as (a) continuation of current trends, (b) reduced volumes of textbook sales because of decreases in the number of people attending college, (c) rapid increase in printing speed, reducing the cost of textbooks and permitting new printing firms without the investment in old equipment to dominate the printing industry. The study might result in alternatives for the publishing firm such as (a) entering the learning field as a direct supplier of an educational service (e.g., the creation and operation of a residential institute or correspondence school), (b) becoming a producer and supplier of audio and video recordings, and (c) selling or spinning off its printing capability and purchasing needed printing services from outside the organization.

Identify Mutual Associations. The purpose of this step is to identify combinations of environmental conditions and strategic alternatives which have the potential for synergism. The concept of systems levels is used to aid this creative task of recognizing remote associations.

This procedure is conducted by documenting the outcome of the futures study under appropriate systems level headings and systematically examining the implications and needs of the alternative human level relationships. This is accomplished by the following steps.

First, each separable result of the futures study (results of steps three and four) is listed under an appropriate systems level

heading for later reference and comparison. A result may be appropriate for several categories, and it may be listed under more than one heading.

Next, each human level alternative, e.g., each alternative future role for the organization, is examined by considering two questions related to its implementation. These questions are: first, what are the implications, in terms of anticipated, facilitated, or inhibited effects at each of the systems levels, of implementing this alternative?; and second, what changes at each of the systems levels would contribute to, or be required for, the successful implementation of the alternative? The lists of results of the futures study are searched for possible answers to these questions. If no answer is found, attention is directed to another alternative, which is then examined by considering the same questions. When examination of a systems level yields results associated with the human level alternative, attention is focused on one of these associated results and the systems levels are examined for study results which are related to it. The procedure continues until no additional relationships are identified for that particular study result, and then the systems levels are reexamined for outcomes related to results which previously were identified as being related to the initial human level alternative but which had not been thoroughly examined for associated results. When all of these results are examined, the next human level alternative is used to begin the search procedure. This is repeated until all human level alternatives have been examined through using the two questions in this systematic fashion. Figure 2 illustrates the search procedure in flowchart format.

The outcomes of this systematic search procedure may be documented

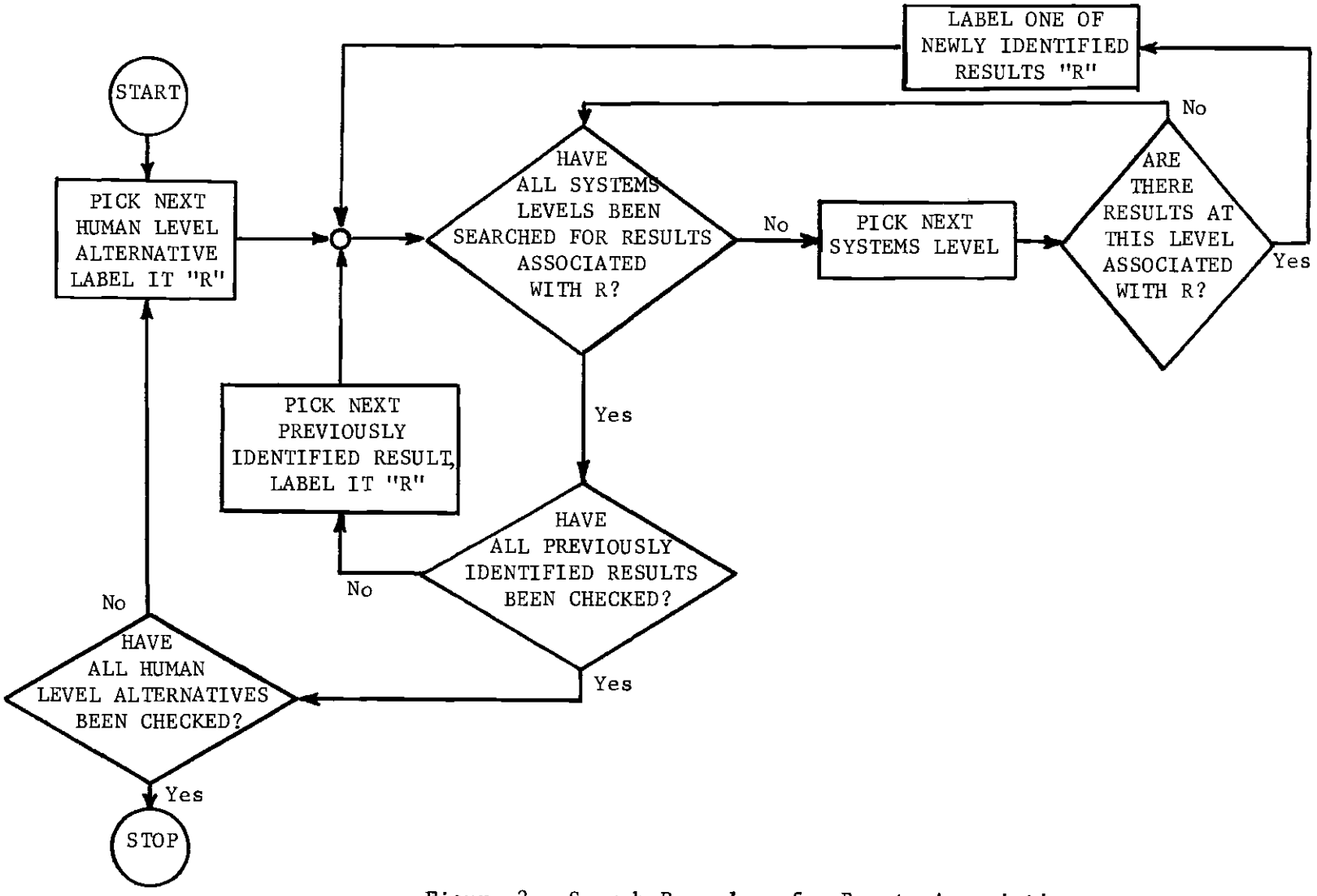


Figure 2. Search Procedure for Remote Associations.

in charts which show the complementary or contradictory associations among the alternatives. Related results are listed on a single chart under appropriate systems levels headings, and the relationships are indicated by arrows between the related results. These outcomes, particularly those alternatives which appear to offer synergistic combinations at the human level, are inputs to the next step, the preliminary evaluation step.

Preliminary Evaluations. The final step in the procedure is the preliminary evaluation of the list of alternatives. This step checks the adequacy of the list by comparing the implications of the alternatives with the initial diagnosis of strategic issues and the characteristics of a healthy organization. As a preliminary evaluation, this step makes the alternative generation procedure a closed loop by using the output of the second step as criteria to determine if the results of the overall procedure are adequate or if additional iterations of the procedure are necessary.

Two comparisons are performed in this step: a comparison of the alternatives with the initial diagnosis of strategic issues, and a comparison of the implications and requirements of the alternatives with systems level characteristics of organizational health.

For the first comparison, the results of the futures study are examined in order to identify alternatives which either directly or by implication address the issues identified by the diagnosis. The list of alternatives categorized by systems levels, developed in the previous step, may be used as the reference list for the alternatives. For each strategic issue identified in the diagnosis step, this list

is scanned to identify an alternative which addresses the issue. When an alternative is found which addresses the issue, the issue is marked off the list of issues and the alternative is identified in some manner. The procedure is repeated for the next strategic issue identified by the diagnosis, and so on until each issue has been compared with the list of alternatives.

If, after comparing the issue list with the list of alternatives, one or more of the issues are not addressed by any alternative on the list, then parts of the alternative generating process may need to be repeated. In this situation, it is either the case that (1) the list of alternatives is inadequate and additional alternatives must be recognized, or (2) the initial diagnosis emphasized the wrong issues and needs to be revised. To resolve case 1, steps three, four, and five should be repeated to identify additional alternatives. If necessary, the scope of the organization and the scope of the generation procedure may be expanded to permit the perception of a larger set of alternatives. The enlarged list of alternatives is then subjected to a preliminary evaluation as described above. To resolve case 2, the present situation of the organization is reviewed, this time with the benefits of the added knowledge and perspectives gained by conducting the alternative generating procedure. This second assessment of the present situation may lead to a revised diagnosis and a new list of strategic issues which then is used in the preliminary evaluation step.

For the second comparison, each human level alternative is examined by considering the same questions as in the previous step: first, what are the implications, in terms of anticipated effects at

each of the systems levels, of implementing this alternative?; and second, what changes of each of the systems levels would contribute to, or be required for, the successful implementation of the alternative? As in the previous step, the results of the futures study may provide some answers to these questions; other answers may have become evident as other steps are conducted. The collection of answers represents a more comprehensive description of the alternatives and a basis for a level-by-level comparison of the expected characteristics of the organization after the alternative has been successfully implemented with the characteristics of a healthy organization. Because this is only a preliminary evaluation, the comparison need be detailed only to the extent that obviously inadequate alternatives are recognized as not meeting the needs of a healthy organization and that obviously adequate alternatives may be tagged for further study and more detailed evaluations.

The result of the two comparisons is a list of alternatives and combinations of alternatives which have been recognized as feasible and potentially desirable future states for the organization. This list is the input to the next step in the strategic planning process, the evaluation step.

Summary

This chapter has described the design of a procedure for generating startegic alternatives for an organization. The design utilizes results from the systems literature, from research on creativity and problem-solving, and from the concepts of systems levels and organizational

health developed in the earlier chapters to construct a systematic procedure which moves from the scope, context, and current state of the organization to a list of possible future contexts and states which represent potential goals for the organization.

The procedure offers the potential benefits of providing a well-defined sequence of activities which can aid in accomplishing a basically creative task. Although well-defined, the procedure retains flexibility and is general enough to be applied in a variety of organizational settings and is not constrained to any particular management style or styles.

The next chapter illustrates these benefits by applying the procedure to the University. Each step in the procedure is demonstrated, and the overall procedure yields a list of strategic alternatives for the University.

CHAPTER VI

ALTERNATIVES FOR THE UNIVERSITY

Scope

This chapter illustrates the procedure for generating alternatives which was described in Chapter V. The illustration is based on the identification of alternatives for the American university as an organizational genotype and utilizes the Delphi technique. The chapter includes the definition of the scope of the organization and environment included in the study and the diagnosis of strategic issues based on an assessment of the history and current situation of the American university. The design, execution, and results of the Delphi study are described and discussed. The chapter includes the identification of relationships among the alternatives and a preliminary evaluation of the alternatives. A list of general alternatives for further study by individual universities is included, but the recommendation of specific actions for particular universities is excluded from the scope of the chapter.

Context

The study in this chapter illustrates part of the process of planning for a university. The output of the study, a list of alternative relationships which a university might establish and maintain with its environment, would be the input to a study which would evaluate

the list of alternatives in detail. In an implementation of the comprehensive process described in Chapter V, planning would be continuous. The inputs to the study described in this chapter might be modified to reflect the results of organizational activities and changes in the environment, and the outputs of the study would be continually revised and updated.

Scope of Organization and Environment

The organization studied in this chapter is the American university, that is, the organizational genotype which includes those institutions in the United States whose purposes are generally teaching and study in the higher branches of learning and which typically comprise both an undergraduate college and graduate schools. The purpose of the study of the university genotype is the generation of alternatives for the organization represented by the university at the local campus level. Of particular interest are universities with strengths and reputations in science and engineering.

The scope of the organization being studied therefore corresponds to a local campus organization of a United States university with established interests and capabilities in science and engineering. The context and environment of this organization is identified by considering the local campus as a system at the cell level. Inputs to the system include incoming students and faculty, tuition income, research contracts and grants, and donations from alumni and others. Outputs include research results and new technology, trained and educated personnel, and economic inputs to the local community. The study therefore

generates alternatives which may be utilized by participants in the decision making process at the local campus level as they plan for the development of their organization.

The scope of the procedure to generate alternatives for the university includes the gathering of information from groups which are affected by the university and have an interest in its future. These groups include university students, faculty, and administrators, government officials, and research administrators. Information from university students, faculty and administrators can assist in defining alternative internal operations of the university, including the educational process and administrative operations. Information from government officials, who make decisions regarding research funds for the university, and research administrators, who hire the trained personnel produced by the university, provides assistance in identifying alternative outputs of the university. All these groups contribute to identifying alternative relationships of the university with its environment.

The scope of the procedure to generate alternatives also includes expected or possible developments in education/learning technology. These include programmed courses, computer-assisted education, new forms of information storage and retrieval, etc. Such developments can greatly affect the range of possible alternatives for the university and in some cases could effect changes not initially anticipated.

The scope of the procedure to generate alternatives also includes societal trends and factors which may act as constraints or incentives to university change. Such factors, which may include the

economic trends in the United States and overall federal policy, although apparently only peripherally related to the university, can influence the perception of alternatives. By explicitly including these factors in the study, it is more likely that their effects can be recognized.

Diagnosis of Strategic Issues

The diagnosis of strategic issues facing the university consists of examining the history and present situation of the organization. The history and current situation are summarized briefly below in two separate sections. The summary of the history is based primarily on the historical reviews of the American university in the books by Jencks and Riesman (1968) and by Palola, et al. (1970). The summary of the present situation utilizes the observations of writers in the press and scholars but views the situation from the perspective of organizational development and characteristics of health.

Historical Perspective

The American university had its origins in the early American colleges, which often had begun as religious schools, with a clergyman serving as the president. Funds came from the sponsoring church, from private philanthropists of the same faith, and from tuition charges paid by the student and his parents (also generally from the same faith). Students were generally from the socially elite and well-to-do families, but this group could not be considered an equivalent to the European aristocracy. All the schools, however, followed the European model of offering a "classical" education: primarily ancient languages, but

with some natural and moral philosophy. The impact of these schools on the social and intellectual order of the day appears slight. Few leaders of the established institutions sent their children to college or had themselves attended; even those who attended (a small minority) seldom seem to have regarded the experience as decisive.

These conditions continued until about a third of the way through the nineteenth century. The election of Andrew Jackson is generally accepted as symbolic of the changes that took place in America during this period. The break with England finally seemed established; a national government had been formed; lands across the Appalachian Mountains had been opened; and the traditions and the institutions of colonial society had been gradually undermined. In this period of change, and as the country experienced a period of growth, subcultures vied for power and legitimacy. As a result, Americans grouped themselves by occupation, by religion, by social class, by locality, and along other lines. As a part of these struggles for legitimacy, special interest colleges were formed to serve limited clientele. Personal factors -- the dreams and dedication of a single man, in many instances -- were important in the establishment of many colleges. Survival and growth, however, depended on other factors: the appeal of the college to enduring hopes and dreams of a good sized segment of society (the serving of the needs of one or more subcultures), and the location of the college in a geographic region that was in some measure self-contained and college oriented.

The governance of the college during this period generally followed the lines of support. The trustees usually were typical of

the subculture served by the college. In addition to selecting the president, the trustees tended to intervene in the college affairs, imposing their personal stamp on the entire college. Faculty, too, came from the same subculture as the rest of the college; when an outsider was hired, he tended to assume the same coloration as his new environment. There was little professionalism in teaching; most instructors had little education beyond the B.A. The instructor was at at the beck and call of the president and trustees; if there was a disagreement, the instructors seemed to have been inclined to move on rather than stay and fight.

Individual students who came to a particular college generally came because their parents fit into the subculture which the college served. There was little mixing, and college attendance seemed to reenforce the students' sense of separateness from other subcultures rather than enlarge their social and cultural experience.

The Civil War was a time of trauma for many aspects of American society, and it marked the beginning of significant changes in American higher education. Three factors arose to stimulate and drive these changes: the elective system, the land grant movement, and the rise of the university.

The elective system permitted students to have a larger element of choice in their studies. As a result, college curricula expanded and broadened. The acceptance of the principle of the importance of all subject matter allowed the scientific and utilitarian courses to assume a prominence previously held only by the classics and humanities. The development of specialities within colleges and the resulting

departmentalization of curricula was concomitant with the increasing numbers of courses.

The Land Grant Act of 1862 put federal support for higher education in the hands of every state government, resulting in the development of many institutions with a popular and practical orientation. The state schools, with this support, became competitive with the private colleges, and the number of students enrolled increased as it became possible to get a degree in more practical and down to earth fields than the classics and humanities.

Yale awarded the first Ph.D. in 1861, and other schools followed, but Johns Hopkins became the first institution to adopt the German model of graduate education: commitment to science and pure scholarly inquiry. Thus the university rose as the embodiment of the aims and spirit of the movement toward higher education.

Teachers within a discipline, particularly Ph.D.'s, tended to develop a commonality of outlook (contrasted with the outlook of those outside the discipline) that gave rise to a professionalism of teachers that had not been evidenced before. This meant that the balance of power in the schools began to shift from the trustees (who no longer exercised the life and death control over the schools because of precarious finances) to the faculty (who, compared with others, could exhibit a united front). This shift of control was not sudden, and was not without conflict, but it was probably a significant step in the development of meritocratic institutions throughout American society.

Palola, et al., calls the period from 1900 to 1940 the "progressive period." It was early in the twentieth century that the practical,

occupational, and service orientation of the university was emphasized and experienced considerable expansion. Extension and service programs grew, broadening the base of the universities' political influence and support. This service aspect completed the three functions of the university -- education, research, and service -- and, over time, the states became dependent on the publicly supported institutions to serve many of their needs.

During World War II, the universities' expertise in science and technology was recognized as a valuable national asset as scientists contributed their knowledge to the war effort through the Manhattan Project, Lincoln Laboratories, and other endeavors. After the war, the GI Bill made it possible for large numbers of veterans to return to the campus, and student enrollment expanded rapidly. The colleges and universities were able to absorb this tremendous influx of students, showing the great elasticity of the higher education system. The possibility of everyone having the opportunity for college education seemed within reach. Because socio-economic success and education seemed linked, this gave rise to the dream of all individuals having unlimited upward mobility simply by getting a college degree.

Sputnik was launched in 1957, and this event catapulted science and engineering into the top spot in educational priority. The country mobilized for the race to the moon by stimulating increased numbers of graduate engineers and scientists and increased research in the universities. The process of federal support for research and graduate studies, begun during and after World War II, reached new heights. The previously demonstrated elasticity of the higher education system was

severely tested as enrollment more than doubled during the period 1958 to 1968 (from 3.2 million to 6.9 million). (Palola, et al., point out that this increase in enrollment represents more students than the total number received by the system in the preceding three centuries, and that the absorption of this increase was a remarkable achievement.) In addition to expansion of existing schools, almost 500 new schools were established, mostly of the community college type.

The appropriateness of government funds for post-secondary schools was justified on the basis of the manpower function of higher education: higher education was an investment in trained manpower, an investment which would pay off in economic prosperity and greater national security. During this period, virtually all schools adopted the growth model of success, and expansion, particularly expansion of graduate programs and research, became the goal.

By the end of the 1960's and as the next decade began, signs of change and impending changes became clearly evident. The period of increasing federal sponsorship of research and graduate studies appeared to have a finite duration after all. The race to the moon had been won; other efforts (less clearly defined) seemed more important than stimulating technological innovations; and, in fact, the rate of technological innovation and technology itself were accused of being the root cause of many societal ills. Dissatisfied students at the better known universities were receiving world-wide attention through news of riots and strikes, and the unrest seemed to spread throughout the entire higher education system. The top executive post at many universities frequently became vacant; the faculty, administration, students,

government officials, and the public often became engaged in heated debates which appeared to do little to reconcile differences. The situation at the beginning of the study was one of tension, uncertainty, and apprehension, and there was not widespread agreement on what should be the organization's response to external changes. A study which focused on the generation of alternatives therefore seemed quite timely.

Present Situation

The University situation at the end of 1970 and the beginning of 1971 presents a complex of aspects. Viewed from the perspective of organizational health, the genotype university (as defined above in the scope section) is judged to be beyond the youth stage of development, in an incipient or early maturity stage. Two primary factors point to this judgement, which is based on surveying information and opinion readily available in current literature.

The first factor is that of the University's input/output relationship, which indicates that continued expansion of capacity to handle increased numbers of students is neither necessary nor desirable. (For details, see, for example, Bowen, 1968, and Niblett, 1970.) In other words, the primary goal of a healthy organization at the youth stage of development, growth, does not seem appropriate for the University at this period in its development.

The second factor underlying the judgement on the organization's current stage of development is the apparent concern, debate, but lack of agreement on the proper roles of the University. Jencks and Riesman (1968), Ridgeway (1968), and Taylor (1969) argue that recent trends in the development of the University's roles represent substantial changes

from the traditional roles of the University (particularly teaching) and are inappropriate for the future development. Jantsch (1969) agrees that current trends are not appropriate, but he argues for even more substantial departures from traditional roles so that the University becomes more of a leader in societal changes. Others (for example, Goheen, 1970, and Moomaw, 1970) do not presume to resolve the issue, but simply agree that the primary issue currently facing the University is that of defining its societal role for the future. In terms of the concept of organizational health, the issue may be restated, in the words of Erikson (1959) and Bennis (1966), as a case of "identity diffusion" or, in terms of the organizational concerns identified by Lippitt (1969), as a need to develop its own uniqueness, adaptability, and contribution to society.

These factors form the basis for making the judgement that the University is currently attempting to make the transition from a youth to a maturity stage of development. A quick assessment of the current state of the University at each of the systems levels and a comparison of the characteristics with the characteristics of a healthy organization (Table 3C) verifies this judgement.

Framework. The current University framework (e.g., departmental structure) is certainly well defined; its flexibility is questionable.

Clockwork. The traditional modes of teaching (e.g., lectures), evaluation (grading), and certification (degree) are being increasingly questioned as to their appropriateness for such an individualized process as learning. There appears to be no built-in mechanism for modifying these existing procedures.

of development.

Identification of Alternatives

Method and Study Design

The study utilized a four round Delphi exercise to elicit and refine the opinions of unpaid volunteers in order to identify future alternatives for the University. The study investigated five aspects of the University in separate sections of the questionnaires, and the scope included aspects of both the internal structure and operations and the external environment of the University. Brief summaries of the areas and the rationale for investigating each one are given below.

Roles. This section of the questionnaires investigated alternative societal roles of the University and compared past role performance with future possibilities. The concept of an organization's societal role is a compact way of summarizing and describing an organization's relationship to its environment, and the human level is the proper focus for defining strategic alternatives. Therefore, this section on alternative roles formed a fundamental part of the study.

Innovations. This section investigated new techniques, ideas, and concepts which might impact on the University. Such innovations offer the potential for providing a wider range of approaches toward implementing organizational goals and the potential for substantial changes in the environment in which the organization operates. Because of this potential for significant impact on the scope and structure of alternatives, this section was essential to the study.

Thermostat. The impact of the changes in funding patterns suggests that the feedback from the environment is not a timely input to policy, or else there is an inadequate process of self-examination.

Cell. Input/output balance is disturbed by changes in federal funding and additional input changes are anticipated because of lower rate of increase in number of students.

Plant. New specialized parts (e.g., interdisciplinary centers) are created only with difficulty; some parts (e.g., departments with greatly reduced student enrollments) seem long-lived.

Animal. Impact of activities (e.g., rapid mobilization to produce large numbers of trained engineers) is not anticipated as clearly as it might be.

Human. Self image is not well-defined and widely shared; there appears to be resistance to subject it to examination. Clear alternatives among roles are not recognized, and definite choices are not made.

Social. There is disunity and unrest among members of the University. Tensions exist, but lack of mutual respect contributes to creating an environment in which individual self-fulfillment seems difficult.

The diagnosis concluded from the examination of the present situation is that the genotype University needs to make the transition from the youth to the maturity stage of development and to develop the characteristics of a healthy, mature organization. The University alternatives generated by the alternative generation procedure therefore should be responsive to the concerns of an organization at this stage

Trends. This section investigated patterns of facts or events which might influence the University. Similar to innovations, trends can act to stimulate and facilitate or to constrain the perception and development of organizational alternatives; therefore, the study included this section in order to better define the influence of these factors on the alternatives for the University.

Effects of Education. This section investigated the possible changes in students which could result from their educational experience. Because one role of the University is education, and because one issue currently being debated focuses on the type of educational experience which the University should provide, this section was included in the questionnaire in order to better define the alternatives.

Student Attitudes. This section investigated the factors which help determine student attitudes. This investigation did not fit into the original scope of the study but was included because of the interest of a potential respondent whose participation was desired.

Participants. Participants in the Delphi study were volunteers who responded to invitations sent to individuals who were in the categories defined in the above section on the scope of the procedure. Invitations were sent to student body presidents and to the chief executive (president, chancellor, etc.) at United States universities which were (1) major universities with strengths in science and engineering, as determined by the Cartter report (Cartter, 1966), or (2) noted primarily for engineering (e.g., Georgia Tech, Rensselaer, Rice). Other invitations were sent to individuals who were interested in the development of the university and had knowledge of university operations,

educational technology, social and organizational behavior and change, research demands (as determined by national goals), or research and educational economics. These latter individuals were identified through a literature search and by personal contact.

Study Procedure

One hundred twenty-two individuals were sent invitations to participate. The invitations were included in a letter which explained the purpose of the study, how it was to be conducted, and what would be required of those who agreed to participate. A copy of the letter and the reply card that was enclosed with each letter is shown in Appendix A. Sixty-four individuals replied to the invitations; forty-three agreed to participate. Subsequent attrition reduced the number of substantial contributors (participants who returned at least three of the four questionnaires) to twenty-one.

Each participant received a complete questionnaire in every round. However, he was only requested to respond to one or more particular sections (depending on his interests and background) but encouraged to respond to as many sections as he desired.

Each questionnaire included a brief summary of the purpose of the round, an estimate of the length of time required to complete the requested portions of the questionnaire, and a desired date for returning the completed questionnaire. Each questionnaire was printed on blue paper, a move intended to increase the visibility of the questionnaire lest it become lost among other papers on the respondent's desk. Included in the material, in addition to the questionnaire itself and a stamped, addressed envelope for its return, was a stamped reply card,

to be used by the respondent to acknowledge receipt of the questionnaire and to indicate the date of its completion and return. The respondent could check that he expected to return the questionnaire by the desired date, or he could fill in a date by which he expected to be able to return it.

Following the basic Delphi approach, each round had a questionnaire designed to gather particular information. This information was processed between rounds, and the last three questionnaires included selected results of the responses from the previous questionnaire. The general procedure in each round is described as follows:

Questionnaire 1. Respondents were asked to list alternative roles, important factors, etc.; these responses were collected, combined and edited where appropriate for clarity, and listed for the next round.

Questionnaire 2. Respondents were asked for preliminary evaluation of items in the list and for perceptions of relationships among the items; these responses were used to screen the items for further investigation and to combine items where feasible; new lists and preliminary group response statistics were prepared for the next round.

Questionnaire 3. Respondents were asked to reconsider their previous evaluation of items after reviewing the new lists and statistics of group response, and they were asked to consider some possible implications of some of the items; these responses were used to assess the items for further investigation to provide group response statistics for the next round.

Questionnaire 4. Respondents were asked to further refine their

previous responses after reviewing the statistics of the group response and to evaluate the implications of some of the trends and of possible consequences to the implementation of some of the postulated innovations.

This general procedure of listing, then compacting and condensing and finally evaluating and refining of opinions was modified to fit the needs of the particular area being investigated. A more detailed summary of the procedure for each section is given below, and copies of the questionnaires are included as Appendixes B through E.

Table 4 summarizes the total number of potential and actual respondents and the number of participants from the various categories. Notice that although no university administrators were sent invitations, several participated as a result of receiving the information sent to the chief executives. Appendix F gives a more detailed description of participation, and Appendix G acknowledges and lists by name and affiliation all contributors except one who preferred that his name not be listed. Details of the procedure followed in each round are given below by questionnaire section.

Roles. In the first questionnaire, the participants were requested to list at least three, but no more than ten, alternative roles, or functions in society, which the university might fulfill. One hundred ten items were suggested. These were classified into major categories, edited, and finally refined into twenty-four separate and relatively distinct roles.

In questionnaire 2, the respondents were requested (1) to scan the list and add any role which they believed had not been included, and (2) to consider each of these twenty-four roles individually and to

Table 4. Number of Potential and Actual Delphi Respondents

	Invited to Participate	Agreed to Participate	Returned at least 3 or 4 Questionnaires
University (Chief Executives)	33	3	1
University (Administration)	0	5	2
University (Faculty, Researchers)	34	11	8
University (Students)	28	13	4
Government	13	4	1
Industry, Consultants, Others	14	7	5
TOTALS	122	43	21

assume that this role were taken by the university as a mission of top priority, then to identify from the list any other roles which, because of their compatibility with the assumed role, would (or could) also be a top priority role. The respondents were also asked to perform the same task and to identify incompatible roles. Based on the responses to this questionnaire, one additional role was identified, and a list of "compatible roles" and "excluded roles" was prepared for each role, using as the criterion the requirement that at least half of the respondents agreed that a given role should be compatible with, or excluded by, another role. This information was included on the next questionnaire, but no further use was made of it.

On questionnaire 3, the respondents were requested to consider the list of twenty-five (twenty-four from the first questionnaire plus the one added by a respondent on the second questionnaire) roles and to evaluate each of them on three bases: how well the university fulfilled the role during the decade 1960-1970; how capable the university is -- at present (1971) -- of fulfilling the role; and the desirability of the university's fulfilling the role in three time periods -- 1971-75, 1976-85, and 1986-2000. The procedure for evaluating the roles was similar for each evaluation. The respondent picked the one role which the university did the most outstanding job of fulfilling (or, the role for which the university is most capable, or the role which seems most desirable for the university to fulfill). This role was assigned a value of "10", and each of the other roles in the list was assigned a value by comparing it with this role: if another role was fulfilled only half as well (or, the university is only half as capable of

fulfilling, or the role seems only half as desirable), it would be assigned a "5", and so on. This procedure assured that the respondents were only required to compare the roles in a pair-wise manner after the first role was assigned a "10", and this appears to be a desirable approach to making comparative evaluations (Dalkey, personal communication). One respondent remarked that the task was equivalent to evaluating what the university "did" (1960-1970), what it "could" do (1971) and what it "should" do (1971-75, 1976-85, and 1986-2000). This shorthand summary was added to the columns above the dates in the final questionnaire and received favorable comment. The responses to this questionnaire were summarized for inclusion on the last questionnaire by calculating, for each of the roles and for each of the five time periods, the median response and the range of the mid-quartiles (i.e., the upper and lower limits of the middle half of the responses).

On questionnaire 4, the respondents were shown the group median and mid-quartile range and their own response to the rasks of role evaluation. They were asked to consider again the alternative roles for each time period and to give their comparative evaluation once more. While the respondent was not encouraged to change his previous evaluation, he was permitted to do so.

Innovations. In the first questionnaire, the respondents were requested to think of innovations in their own area of interest which may have a great impact on the university and which during the next thirty years they believed would be likely, urgently needed, or feasible. From the results of this questionnaire, thirty-three postulated

innovations were distinguished, and these were listed on the next questionnaire.

On the second questionnaire, the respondents were requested to evaluate each postulated innovation in terms of their estimates of (1) its impact on the university (respondents could check "great," "moderate," or "slight," (2) its desirability (respondents could check "extremely desirable," "extremely undesirable," or "other"), and (3) its overall feasibility, including technical and political (respondents could check "high" -- probability of .75 or greater, "moderate" -- probability between .25 and .75, or "low" -- having a probability less than .25). The responses to each innovation were counted for each rating, and the median ratings for "feasibility" were included on the next questionnaire. (For some items, feasibility ratings were about equally distributed; these were reported as "no agreement.") In addition, nine postulated innovations were chosen for special consideration. These nine had elicited an ambiguous group response as to the desirability (the median response was "other," or there was disagreement as to the desirability), but there was general agreement that the impact on the university would be "great" or "moderate."

On questionnaire 3, the thirty-three postulated innovations were listed with the median group estimate of its feasibility of each. The respondents were asked to consider each innovation and to make three responses. They were first asked to rate the degree of their own competence, knowledge, and experience in the area of the postulated innovation by using a number scale -- "4" for extensive experience and

knowledge, and so on down to "1" for little knowledge or experience pertinent to the area. Next, the respondents were asked to assume that the postulated innovation would be implemented and (A) to estimate the year by which there is a 50% chance of its being implemented, and (B) to estimate the year by which there is a 90% chance of its being implemented.

Because the range of responses, the number of responses, and the self-rating of the respondents all seem to be related to the quality of a group's response (Dalkey, Brown, and Cochran, 1969), the group of responses chosen to compute the statistics for this round was selected using these measures. The subset of responses from all respondents who rated themselves either "3" or "4" was used to compute the statistics if the following conditions held:

1. there were at least 7 responses in this subset;
2. the mid-quartiles range of the subset was no larger than the mid-quartiles range for the entire set (self-ratings 1-4) of responses;

otherwise, the entire set of responses was used to compute the statistics. The "average self-rating" corresponds to the average of the group used to compute the statistics.

In addition to the above estimates for each of the thirty-three innovations, nine innovations were considered further. For these innovations, the respondents were requested to assume that each had been implemented and to list possible consequences, both desirable and undesirable, of this implementation.

The sets of responses to the task of listing possible consequences to each of the nine innovations were edited. Seven of the sets (i.e.,

responses for seven of the innovations) were included on the next questionnaire; two were eliminated because of the respondents' agreement that they were unlikely.

On questionnaire 4, the respondents were requested to rate each of the events suggested as a possible consequence of one of the seven postulated innovations in terms of (1) its liklihood of occurrence assuming the postulated innovation were implemented (respondents used the numerals 1 through 4 to designate "almost impossible," "possible," "probable," or "virtually certain"), and (2) its effect -- very detrimental, detrimental, no effect, favorable, or very favorable -- on the development of the university. These responses were used to calculate a group median response and the mid-quartiles range.

Trends. On the first questionnaire, the respondents were requested to list at least three, but no more than ten, trends which they perceived as being extremely important in the development of the university over the next thirty years. From these responses a list of thirty-seven trends was prepared for the next questionnaire.

On questionnaire 2, the respondents were requested to consider the statement describing each perceived trend and to estimate (1) the importance of the perceived trend to the university -- very important, moderately important, slightly important, or unimportant, and (2) the present strength of the perceived trend -- nonexistent, slight, moderate, or strong. Statistics (median and mid-quartiles range) were computed for these responses. For twenty-five of the trends, either the median estimate of the importance of the trend was "very important" or "moderately important," and these twenty-five statements were listed for

the next questionnaire. For each statement, the median and mid-quartile range of the group response and the respondent's own response to the "present strength" were included on the next questionnaire.

On questionnaire 3, the respondents were requested to consider each trend statement, estimate once again its present strength (non-existent, slight, moderate, or strong), and to estimate its behavior in three future time periods: 1972-75, 1976-85, and 1986-2000. Future estimates were to be given as "decreasing" (i.e., reversal of the present trend), "unchanging," or "increasing," or "strongly increasing." Calculations of the median and mid-quartiles range statistics of these responses suggested several trends that would be worth investigating further because they were expected to increase in strength over the next thirty years. Five of these were selected for investigation on the next questionnaire.

Questionnaire 4 listed the five trend statements along with statements which described the median group responses of their present strength and their future behavior. The respondents were requested to assume that these descriptions were accurate and to comment on their meaning to the university by considering such questions as: What should be the university's response to the trend? What problems or opportunities are suggested by the trend? The comments were collected and edited.

Effects of Education. Undergraduate and graduate education were considered separately, but the approach was the same in each case. In the first questionnaire, the respondents were requested to consider the process of higher education as a series of experiences occurring to the

student which might produce changes in the student, and the respondents were to imagine a set of characteristics by which the student might be measured before and after his educational experiences in order to evaluate the higher education process. The respondents were requested to list at least five, but no more than ten, such characteristics. From the responses, thirty-two undergraduate characteristics and twenty graduate characteristics were distinguished. These were listed in the next questionnaire.

In questionnaire 2, the respondents were requested to rate the relative importance of the characteristics by choosing the most important characteristic, assigning it a "10," and assigning numbers to the remaining characteristics by comparing each of them to the most important one. In addition, the respondents were requested to consider each characteristic once more, scan the list and list any of the other characteristics which seemed to be closely related to the given characteristic. These responses were collected and the median and mid-quartiles range statistics of the evaluation were calculated. The number of characteristics was reduced by grouping together the characteristics which the respondents perceived as being closely related.

The clustering method was based on a matrix which showed the number of times a particular characteristic was perceived by the respondents as being related to another particular characteristic. From this matrix, a diagram was constructed which enabled the relationships to be visualized more easily. The numbers of the characteristics were written on the diagram, and arrows drawn from one characteristic number to another to indicate that the second characteristic had been perceived

by at least some criterion percentage of respondents as being related to the first. The creation of a second diagram, the same as the first except for spatial rearrangement of the numbers -- placing related numbers closer together -- was helpful in visualizing what characteristics belonged in a cluster. Only about half the respondents to this section made any response to this "related characteristics" task. The criterion was set at 80% of those who did respond to the task; a less stringent criterion of 60% was used as supporting and verifying the existence of a cluster. This method of identifying groups of characteristics which could be treated as a single characteristic is based on the same principles as more elegant and refined techniques (e.g., see Tryon and Bailey, 1970). The latter methods were not used because they would have required that the respondents perform a considerably more demanding task of relating each of the items in the list to each of the others, and this seemed inappropriate for unpaid volunteer respondents. The method used required more effort on the part of the study director, and required the exercise of more judgement, compared with the more elegant approaches, but the loss of rigor involved was judged not to endanger the primary objective of the study, which was to develop alternatives.

The lists of characteristics were rearranged and renumbered to reflect the clusters of characteristics resulting from the above procedure. (The number of undergraduate characteristics was reduced from thirty-two to eighteen; the number of graduate characteristics from twenty to sixteen.) These lists and the statistics for each of the (old) characteristics were included in the next questionnaire, along

with each respondent's own response.

In questionnaire 3, the respondents were requested to evaluate the new list of characteristics in the same manner as before, assigning a "10" to the most important characteristic (or group of "old" characteristics), taking into account any of the included information that he wished, and to repeat the evaluation for each of three time periods: 1971-75, 1976-85, and 1986-2000. The results were used to calculate the group statistics of median and mid-quartiles range. There was substantial agreement on the relative importance evaluation of the graduate characteristics, and no further responses were requested on them. The group statistics and the respondent's previous response for each undergraduate characteristic was included in the next questionnaire.

In questionnaire 4, the respondents were requested to consider the list of characteristics, the group response statistics, and their own previous response and repeat the comparative evaluation of the characteristics as before. The results were used to calculate the final group response.

Student Attitudes. Because of the peripheral nature of information from this section, the procedure and results are presented in Appendix H.

Results

Roles. The results of questionnaire 4 are shown in Figure 3 which gives the groups' responses for each role by each time period in terms of the median response and the upper and lower limits of the middle half of the responses. It may be noted that only a few roles are visualized as decreasing in importance, namely, the roles of "social servant--

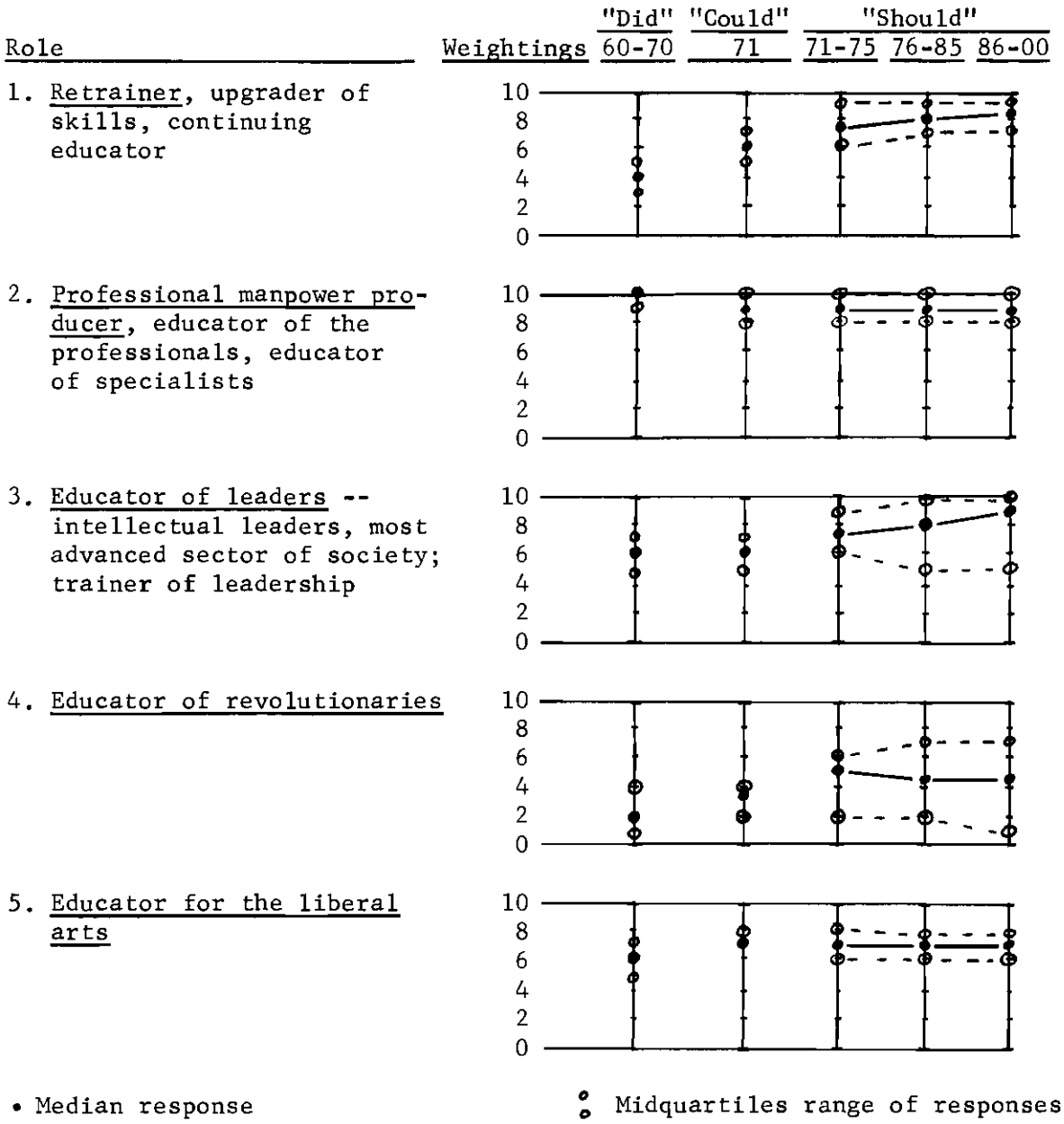


Figure 3. Alternative University Roles.

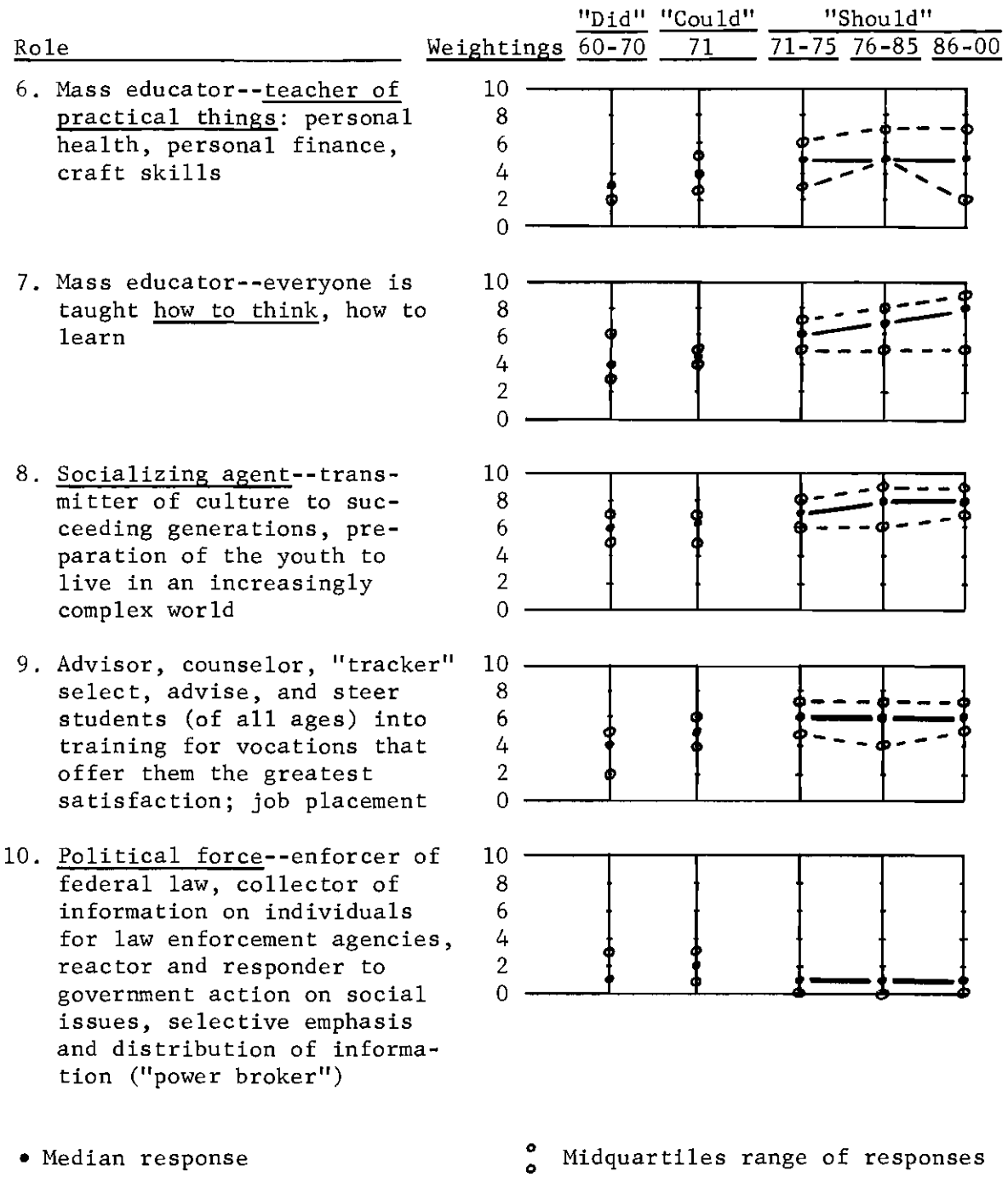
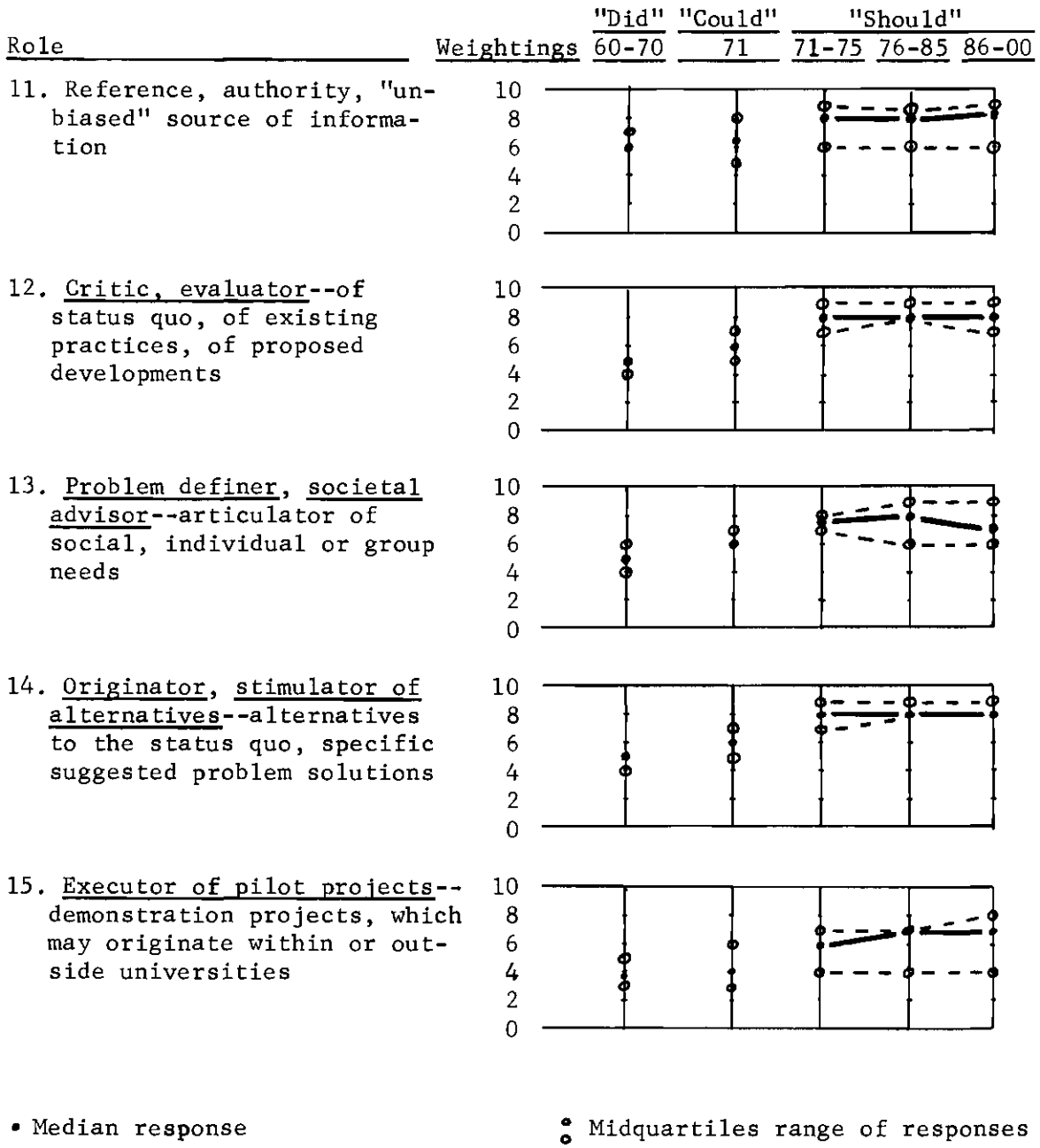


Figure 3. (Continued).



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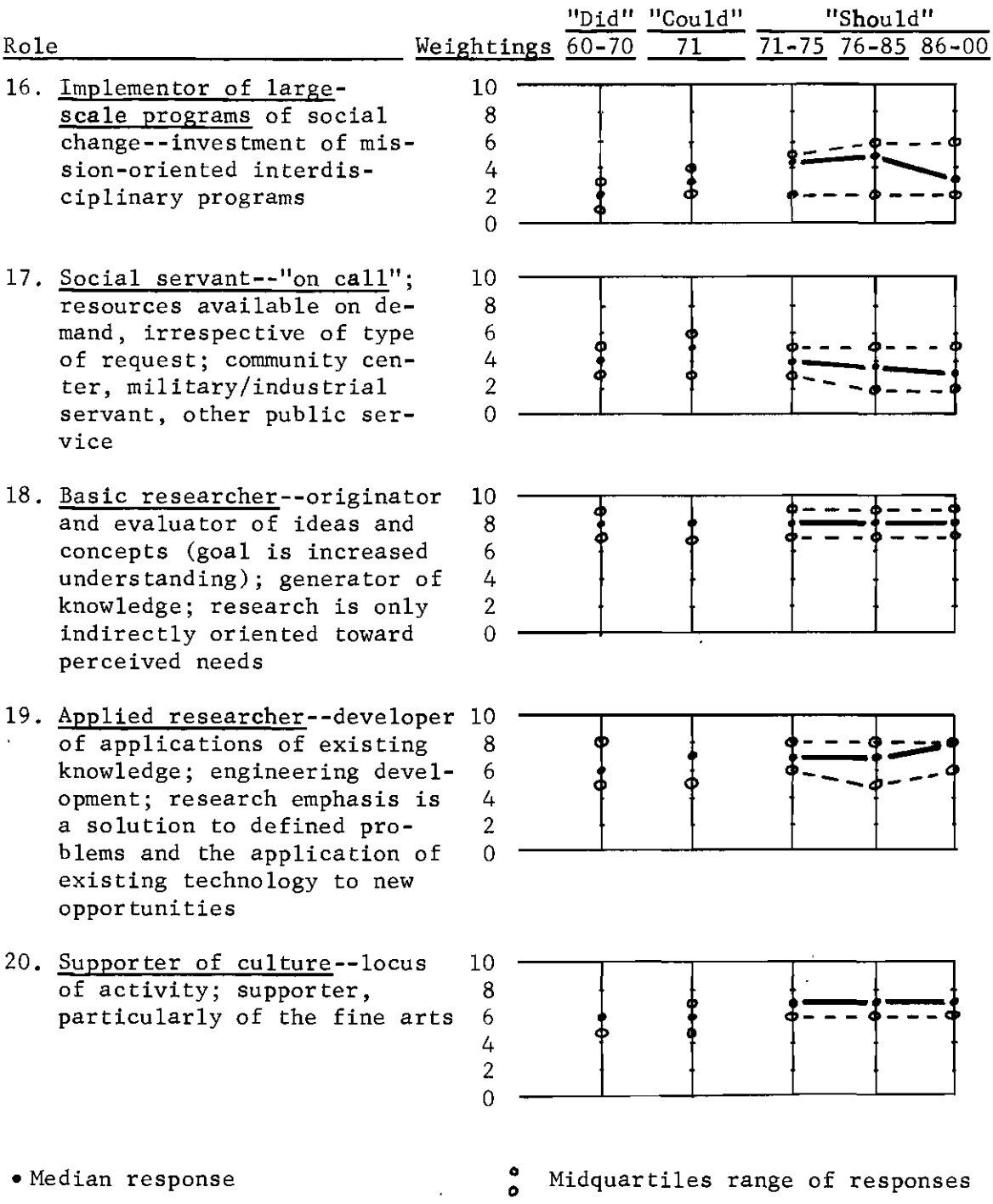

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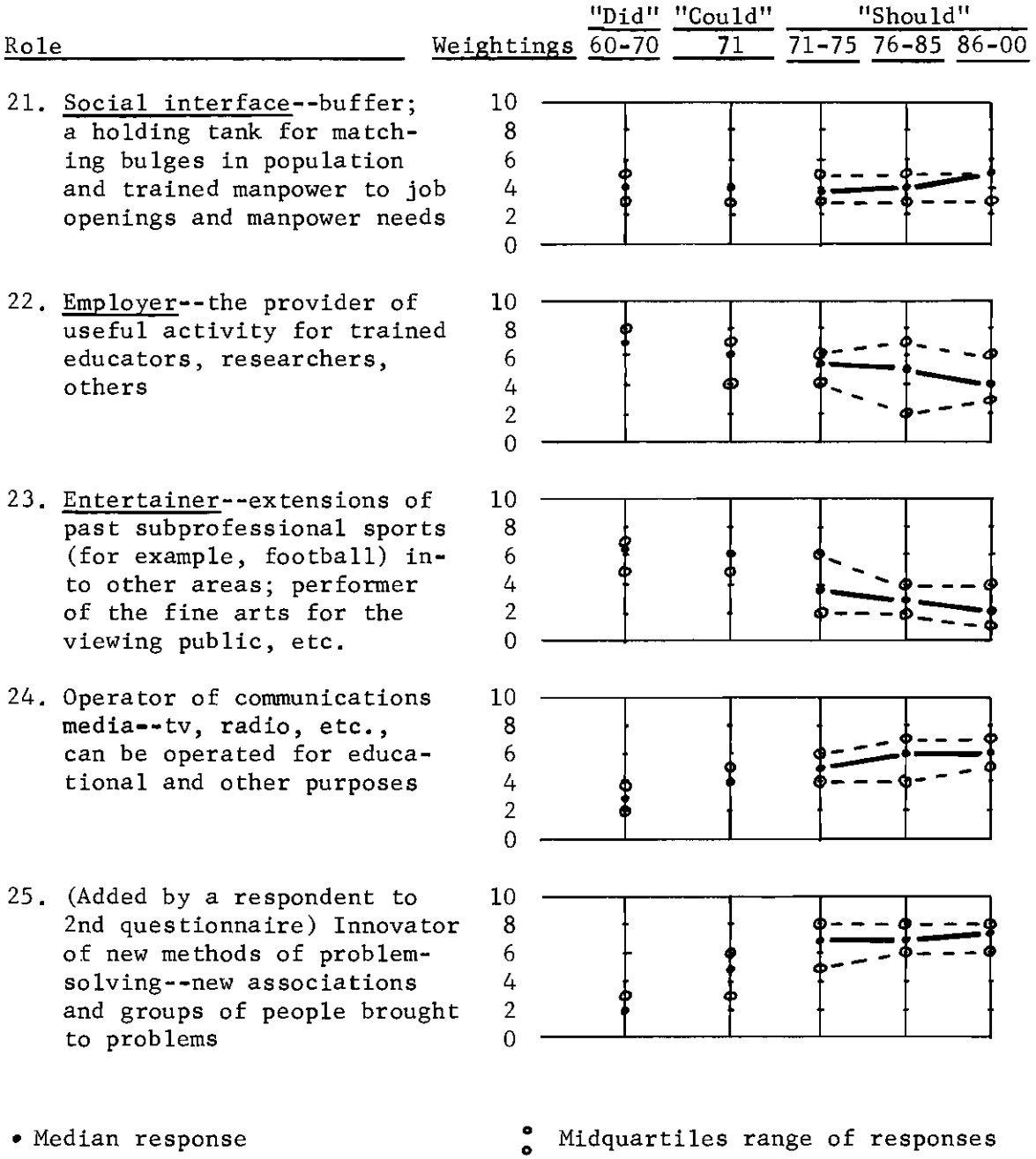


Figure 3. (Concluded).

on call," of "entertainer" (as with sub-professional football), and of "employer -- the provider of useful activity for trained educators, researchers, and others." Several roles are visualized as increasing in importance: continuing educator and retrainer, innovator of new methods of problem-solving, operator of communication media, critic and evaluator, and mass educator.

In addition to identifying alternative roles for the University, Figure 3 provides additional information about the perceptions of the respondents regarding future University activities. The results in Figure 3 suggest that the respondents tended to expect the University to fulfill more roles, to a greater degree, in the future than it has in the past. Figure 4 shows a histogram of the number of times each role weight was used within each time period, and it is apparent

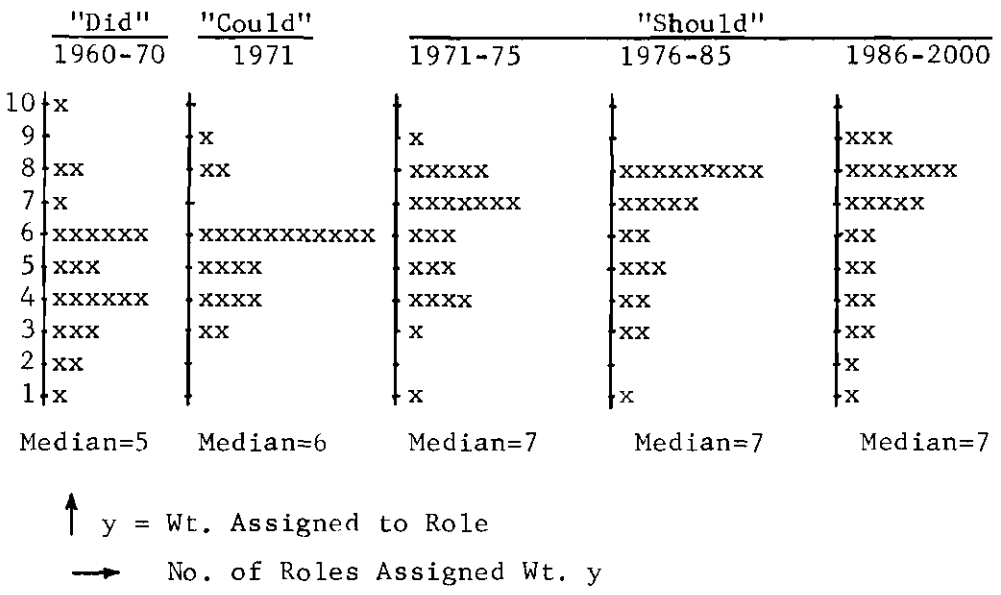


Figure 4. Number of Roles Assigned Each Weight, by Time Periods.

that the weights assigned are generally lower for the past and present time periods. Two statistical tests verify that the respondents assigned higher weights to future roles. The sign test (Bradley, 1968) was used to compare the median role weights in the different time periods, and, as shown in Table 5, the median response is significantly higher for future time periods than for the past and present periods. The Smirnov Maximum Deviation Test for Identical Populations (Bradley, 1968) was used to compare the distributions of the median responses for each role in the five time periods. The results, shown in Table 6, are consistent with the hypothesis that the responses come from two distinct distributions: one for the future and one for the present and past. The respondents apparently believe that the University should, in the future, perform better at more roles than it has in the past.

Innovations. Figure 5 shows the group responses for the estimated feasibility and probable time of implementation for each of the postulated innovations. The figures are self-explanatory, and it may be seen that implementation of particular innovations could have a great impact on the University. The earliest implementation perceived are those of the application of PPBS and other management systems within the University (number 6), long-term deferred tuition (number 11), and diverse degree tracks (number 12). The actual implementation of some potential innovations were virtually rejected by the respondents: medically-aided learning (number 23), replacement of the lecture by books (number 24), and an electronic world university (number 29). Between the relatively high feasibility and early implementation of the former innovations and the relatively low feasibility and late (if ever)

Table 5. Comparison of Median Role Weights by Time Period

Periods*	Number of Roles with Higher Median in the Respective Periods		Sign Test Significance (P<)
1;2	3;18	(4 same)	.01
1;3	3;19	(3 same)	.001
2;3	5;16	(4 same)	.05
3;4	4;9	(12 same)	N.S.
3;5	6;10	(9 same)	N.S.
4;5	5;7	(13 same)	N.S.

*1 = 1960-70 ("did"), 2 = 1971 ("could"), 3 = 1971-75 ("should"), 4 = 1976-85, 5 = 1986-2000

Ref: Figure 3 and Bradley (1968).

Table 6. Maximum Deviation Between Median Role Weight Distributions

Periods*	Maximum Difference	Smirnov Test Significance (P <)
1;2	.20	N.S.
1;3	.40	.025
1;4 & 1;5	.48	.005
2;3	.36	.05
2;4 & 2;5	.44	.01
3;4	.16	N.S.
3;5	.20	N.S.
4;5	.12	N.S.

*1 = 1960-70, 2 = 1971, 3 = 1971-75, 4 = 1976-85, 5 = 1986-2000

Ref: Figure 3 and Bradley (1968); Figure 4 is illustrative, but not directly comparable because of interval grouping

Note: Peaks of areas represent median response, width represents mid-quartile range. Unshaded areas correspond to dates of .50 probability of implementation, shaded areas to dates of .90 probability of implementation.

Innovation	Median Feasibility	Average Self Rating
1. New Language: development which, with portable machines, would permit anyone to speak in any language and receive a printed text readable by all; one written symbol language for any spoken input language	Low	1.9,1.8
2. 30-Hour Work Week	High	2.1,2.1
3. Mass Computer Utilities: computer terminals in homes will be as common as telephones are today	NA	3.5,3.5
4. Re-emergence of presidential leadership: strong leadership in setting goals and defining objectives; wider discretionary power	Mod	2.6,2.5
*5. University Reorganization: the elimination of the autonomy of individual departments	Mod	3.7,3.7
6. Application of "Planning-Programming-Budgeting System" to Universities: more critical definitions of costs, benefits; applications of systems concepts and computer-based information systems to support decision-making, administration, and management of the university	Mod/Hi	3.6,3.6
7. Participatory Decision-Making: new forms of organization that will permit the legitimation of interaction between those holding diverse views	Mod	3.6,3.6
*8. New Organizational Structure: increased control by faculty and students, less by administration; incentives for university government to be more responsive to "consumers" of education	Mod	3.4,3.5

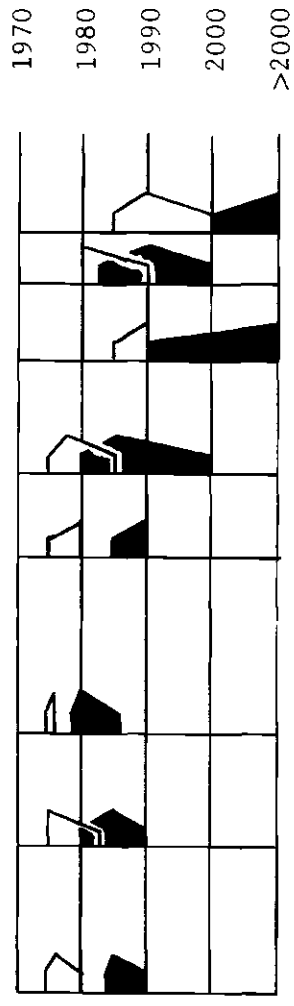


Figure 5. University-Related Innovations.

Note: Peaks of areas represent median response, width represents mid-quartile range. Unshaded areas correspond to dates of .50 probability of implementation, shaded areas to dates of .90 probability of implementation.

Innovation	Median Feasibility	Average Self Rating
9. Doctoral Program with Emphasis on Teaching: professors would have the function of instructing rather than research and publishing	N/A	2.6,3.3
*10. Elimination of Grading System: perhaps replaced by system of "pass/no record"	Mod	3.4,3.4
*11. Long-term Deferred Tuition: students can make the investment decision regarding the worth of an education with respect to future earning potential . . . . . (Note: response to 2nd questionnaire was not in agreement as to impact of this innovation)	High	3.3,3.3
12. Diverse Degree Tracks: more flexible arrangements, less strict credit requirements for degrees	High	3.3,3.3
13. Restructured Undergraduate Education: each student experiences a variety of educational environments, perhaps shorter degree programs with no major, students can move between disciplines; professional development relegated to graduate studies	Mod	3.2,3.2
14. New Educational Patterns: rather than advanced degrees, student takes two or more bachelor-level degrees--medical/legal degree, engineering/business, etc.	Mod	3.0,3.0

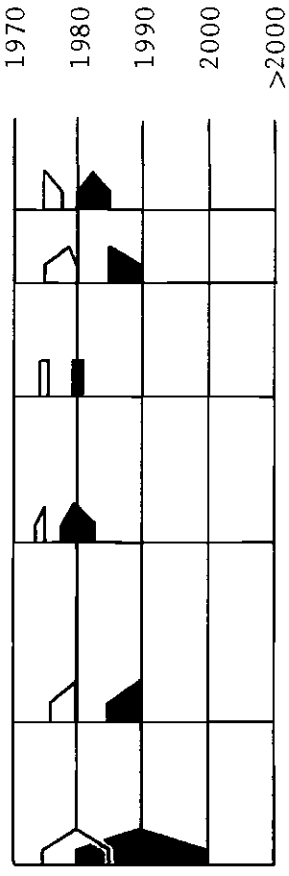


Figure 5. (Continued).

Note: Peaks of areas represent median response, width represents mid-quartile range. Unshaded areas correspond to dates of .50 probability of implementation, shaded areas to dates of .90 probability of implementation.

Innovation	Median Feasibility	Average Self Rating
15. "Distilled" Courses for Non-majors (not "introductory" courses): science and technology courses in liberal arts schools, social and behavioral courses in engineering schools, leading to more effective social direction for technology	Mod	2.6,2.6
16. New Educational Time Scale: students learn throughout life, with interruptions, getting earned degrees at any time	High	2.7,2.6
17. Processes to "Retread": emphasis on correcting mature obsolescence rather than catering solely to immature individuals	High	3.4,3.4
*18. Acceptance of Universality of College Degree: college degree becomes like high school degree today--representation of time-in-grade, "equivalentcy tests"--and recognition that government must pay cost, as for high school education today	Mod	2.3,2.1
19. Student Community Concept: new, much different form of dorm living	Mod	2.2,2.1
20. Smaller Educational Units: widespread acceptance and use of educational units consisting of 600-1200 students	Mod	2.2,2.2
*21. Machine Tutors: individual students proceed at their own pace through responsive communication with computer terminal	High	3.8,3.9

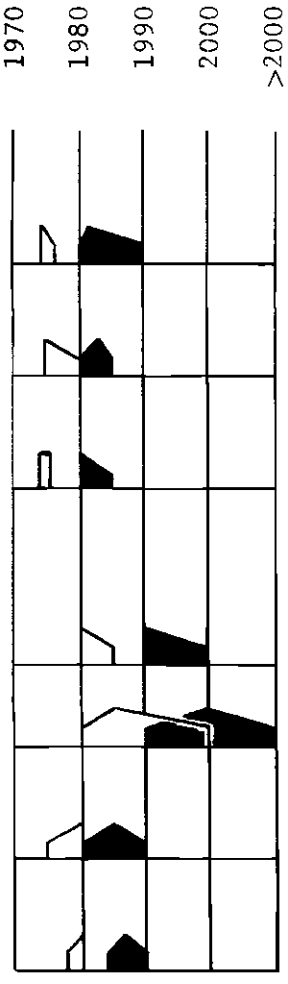


Figure 5. (Continued).

Note: Peaks of areas represent median response, width represents mid-quartile range. Unshaded areas correspond to dates of .50 probability of implementation, shaded areas to dates of .90 probability of implementation.

Innovation	Median Feasibility	Average Self Rating
22. Multi-media Teaching Machines: utilizing more than simple auditory or visual senses	Mod	2.4,2.3
*23. Medically Aided Learning: chemicals, hypnosis, and other means of permitting rapid assimilation of factual material--for example, a textbook can be permanently assimilated in 30 minutes	Mod/Low	1.6,1.5
*24. Replacement of Lecture by Books: virtual extinction of lecture for transferring information, function fulfilled by books	Low	2.8,2.8
25. TV Tape Cassettes: widespread use--tape libraries displacing book libraries, TV sets become readily available educational machines to be used at an individual's convenience	High	3.2,3.2
26. Smaller Classes: deemphasis on lecture format; smaller, more personal classrooms with professor leading discussions; emphasis on individual educational experience (e.g., participation in research, etc.)	Mod	3.4,3.5
27. New Communication Device: one that permits mass lecturing with sensations of touch, feel, smell and interaction now possible only in small classes	Mod	1.9,1.8
*28. Communiversities: educational institutions which are located throughout, and interdependent with, the community of which they are a part	Mod	2.2,2.2

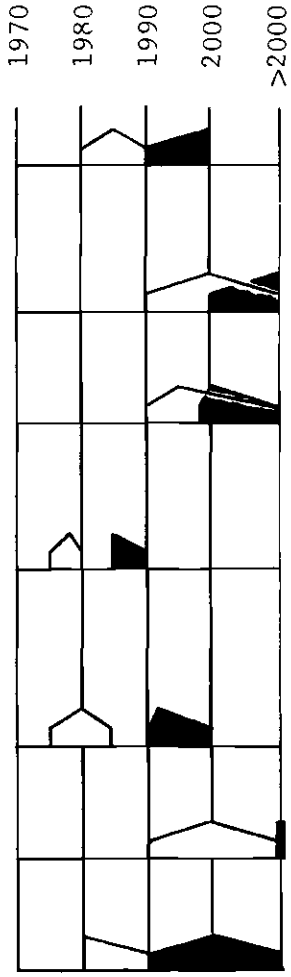


Figure 5. (Continued).

Note: Peaks of areas represent median response, width represents mid-quartile range. Unshaded areas correspond to dates of .50 probability of implementation, shaded areas to dates of .90 probability of implementation.

Innovation	Median Feasibility	Average Self Rating
29. Electronic World University: world-wide communication network which would permit international classroom experience via two-way communication links	NA	1.8,1.9
30. Dispersed Classrooms: with audio responses possible to audiovisual presentations	High	2.4,2.4
31. University without Walls: mass media education, particularly TV, enlarging the audience for university faculty	High	3.1,3.1
32. Professor's Role: changed from "teacher" to "facilitator of learning"	Mod	2.8,2.8
33. Simplified Information Storage and Retrieval System: urgently needed, present process is too cumbersome	Mod	3.3,3.2

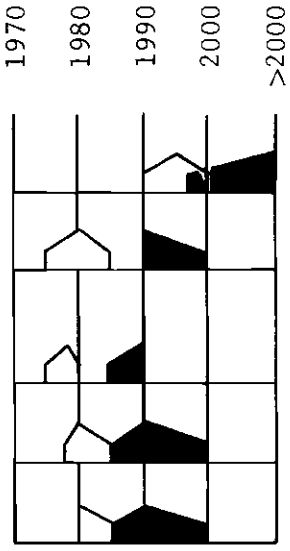
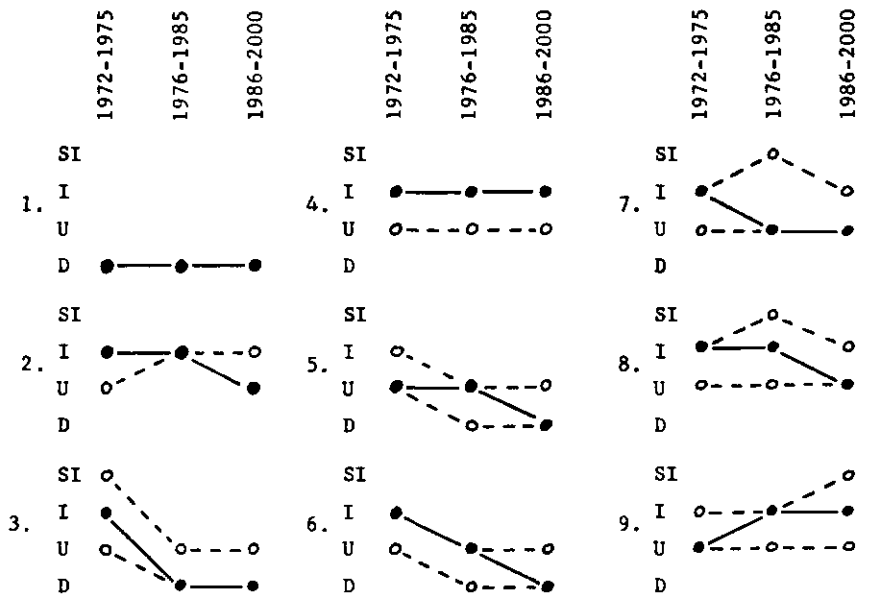


Figure 5. (Concluded).

implementation of the latter innovations, falls the large group of innovations which represent alternative future directions, capabilities, and environments for the University.

Trends. Figure 6 (parts 1-3) shows the group responses from questionnaire 3 on twenty-five trends perceived and identified by the respondents as being important to the University. The figures show the median and mid-quartiles range of the responses and the present strength of the trend according to the median response. Some of the more apparent trends of increasing strength include the trend toward a service economy (number 2), the emphasis on educational technology (number 4), opportunity for learning outside the classroom (number 17), recognition of the nonessential nature of college attendance (number 18), need for continuing education (number 20), emphasis on community colleges (number 22), and financing problems (numbers 23, 24, and 25).

Effects of Education. Figure 7 presents the results of the group responses on the relative importance of measures of the effectiveness of undergraduate education. The median and mid-quartiles range of the responses in each of the three time periods are shown. Little difference between the relative importances in the near time period and in the later time periods is evident. However, it is noted that specific skills in a major area (number 10) is not the most important measure of undergraduate education effectiveness. It falls below other measures, including attitude and tolerance toward others (number 2), creativity (number 3), capability and motivation for continued learning (number 6), perceptiveness and ability to generalize (number 7), and social maturity (number 11).

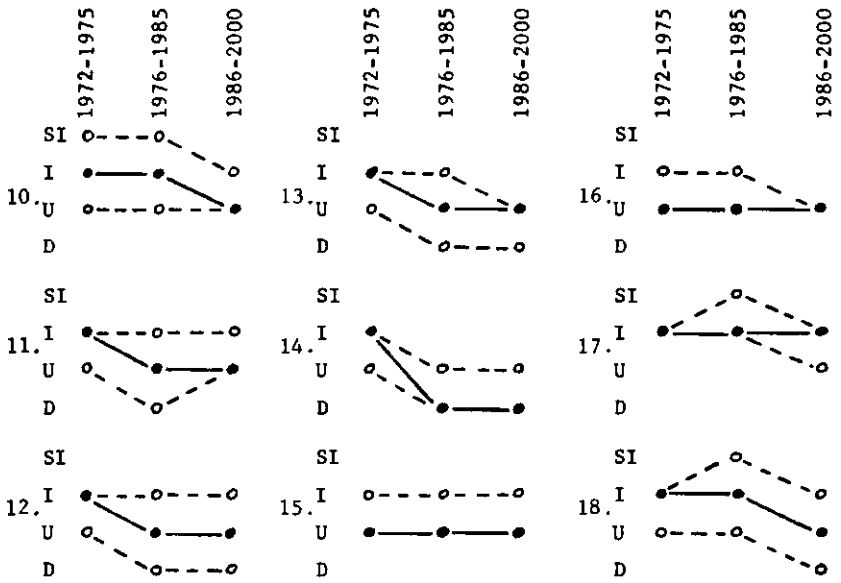


SI = Strongly increasing, I = Increasing, U = Unchanging,
D = Decreasing, ● Median response, ○ Range of Mid-quartiles

Trend	Present Strength
1. Continuation of war in Southeast Asia	M^+
*2. Trend toward service economy, and thus an increasing number of people required in labor-intensive service industries	M^+
3. Tightening job market for professionals	M^+
*4. Increased emphasis on educational technology and automated information handling services	M
5. Increasing divergence of objectives--as viewed by the public and as viewed by the academic community . .	M-
6. Disillusionment with science and technology	M-
7. Diffusion of experimental attitude and increasing readiness to support evolutionary change throughout social institutions	Sl^+
8. Increasing emphasis on problem solving approach: "how to think" rather than "what to think"; "methods" rather than "facts"	Sl^+
9. More widespread use of "synthesis"/"gestalt"/ "total systems" approach rather than piece-by-piece analysis; creating increased need for synthesizers and generalists rather than specialists . . .	Sl^+

*Included on final questionnaire.
N = Nonexistent, Sl=Slight, M=Moderate, S=Strong, NA=No Agreement;
+ and – indicate that the mid-quartiles range extends above and below, respectively, the given median.

Figure 6. Perceived Current and Future Trend Behavior.

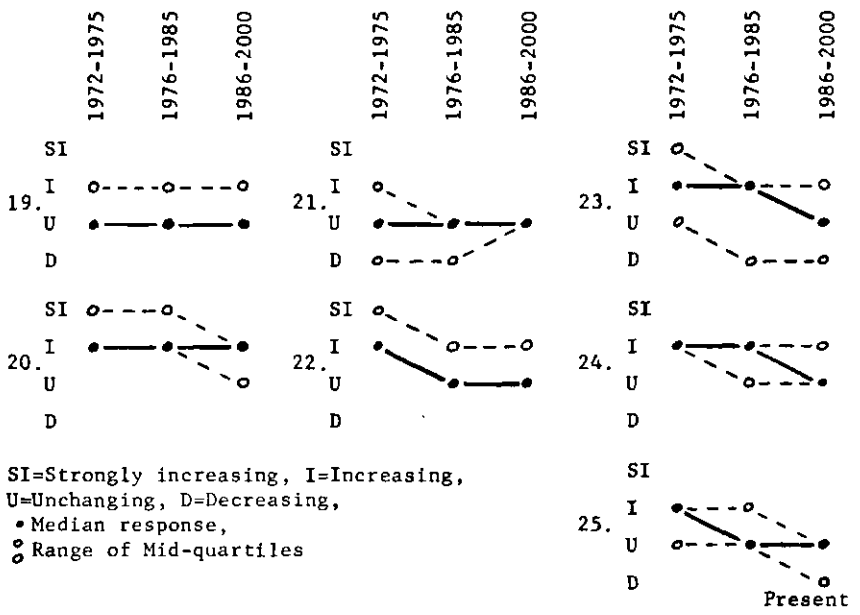


SI=Strongly increasing, I=Increasing, U=Unchanging,
D=Decreasing, • Median response, ⁚ Range of Mid-quartiles

Trend	Present Strength
10. Increasing concern with environment; emphasis on ecology and homeostatic (dynamic) equilibria rather than point (static) equilibria	NA
11. Criticisms and challenges to traditional department structure and undergraduate education	M
12. More participatory organizations throughout society; increasing individual concern with policy and increasing organizational responsiveness to the demands for self-government	M-
13. Increasing student involvement in academic decision-making	M-
14. Politicization of the University	M-
15. Rise in effective human intelligence	N/Sl
16. Humanistic Renaissance; education to discover potential of man and not just for earning money . .	Sl^{+}
*17. Increasing opportunity for, and recognition of, informal learning (outside the classroom)	Sl^{+}
18. Increasing recognition that college attendance is not essential to a successful life	Sl/M

*Included on final questionnaire.
N = Nonexistent, Sl = Slight, M = Moderate, S = Strong,
NA = No Agreement, + and - indicate that the mid-quartiles range extends above and below, respectively, the given median.

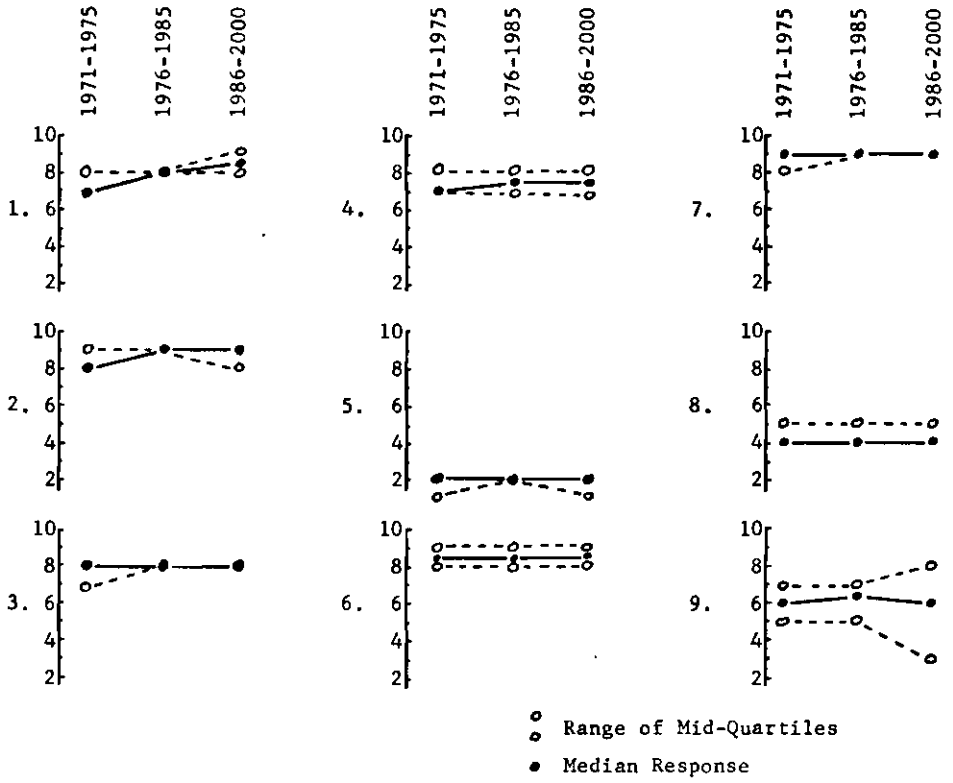
Figure 6. (Continued).



Trend	Present Strength
19. Increasing number of enrollments and graduates, trend toward everyone having the opportunity for higher education	M
*20. Increasing need for continuing education and retraining because of rapid obsolescence of education and occupations	M
21. Separation of research activities from the university; separation of scholarly activities from instructional activities	Sl-
22. Growth of, and increased emphasis on, community colleges	S
23. Increasing cost of education--total cost and unit (per student) costs are increasing	S-
*24. Increasing state and federal involvement in university planning and operations through the increasing dependency of the university on public funds; distinction between private and public institutions becoming blurred	M^+
25. Apparent gap between federal funding trends and university needs--both in total amount and in distribution	M^+

*Includes on final questionnaire.
N=Nonexistent, Sl=Slight, M=Moderate, S=Strong, NA=No Agreement,
+ and - indicate that the mid-quartiles range extends above and below, respectively, the given median.

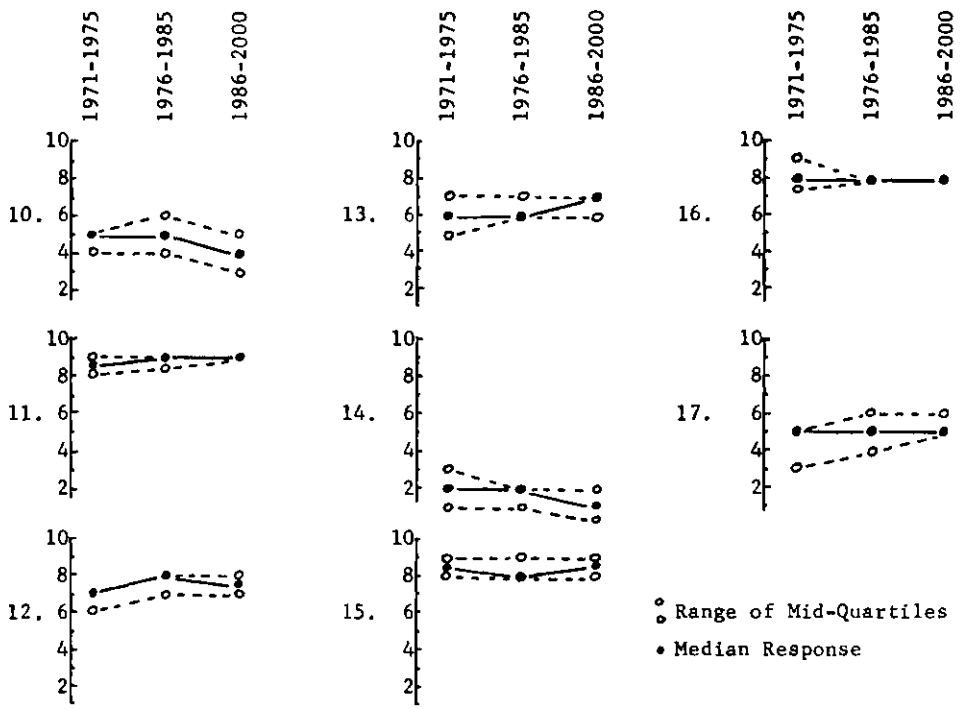
Figure 6. (Concluded).



Characteristics

1. Ability to understand how new knowledge is developed; ability to utilize existing knowledge; analytic skills, ability to approach problems logically, objectively, and persistently; capability for problem analysis and solution; ability to organize intellectual material; ability to think critically, to make judgments on issues, to select the best or worst from alternatives and to seek new alternatives; intellectual maturity
2. Attitude toward other persons; tolerance, understanding, and respect for different attitudes, values, and beliefs, self-respect
3. Creative capability
4. Breadth and scope of interests; interests in and ability to engage in activities beyond one's job
5. Response to authority, capability to do an assignment neatly and on time without questioning the reasoning behind assignment
6. Respect for, identification and excitement with, learning process and continued learning; motivation to learn; capacity for further learning; ability to undertake life-long learning programs; time required to gain new skills
7. Ability to generalize; ability to visualize interrelationships (particularly among disciplines); ability to foresee results of actions; perceptiveness and ability to think about complex topics
8. Skills in abstraction and symbolism; ability to solve original mathematical problems
9. Ability to work in any situation

Figure 7. Relative Importance of Undergraduate Characteristics.



Characteristics

10. Specific skills in a major area (within a discipline); research skills; capability of doing graduate work

11. Social maturity; ability to relate to society; revolutionary perspective; a sense of time and history; a sense of reality; self-awareness, awareness of stress and limits, awareness of own ability and interests; ability to relate self, society, and culture; individual maturity; awareness of, and interest in, problems facing humanity

12. Sensitivity to aesthetic qualities; general accumulation of knowledge; an awareness of the complexities and range of phenomena; knowledge of liberal arts

13. Bureaucratic sophistication, ability to work in and around large organizations

14. Alienation (from parents and society); disillusionment

15. Ability to bear responsibility, to assume and use authority, to comprehend and use power; acceptance of responsibility for individual action and social consequence; dependence, individualism; capability for self-definition and motivation; set of values based on reason; commitment to objectivity, rational opinion, and a questioning attitude; understanding of the relationship between information and quality of judgment; ability to set goals and attain them to discipline one's thinking

16. Communication skills (both verbal and written); competence of personal interaction

17. Social habits; behavior related to personal health and environment; degree of socialization, degree to which the student accepts the values of society

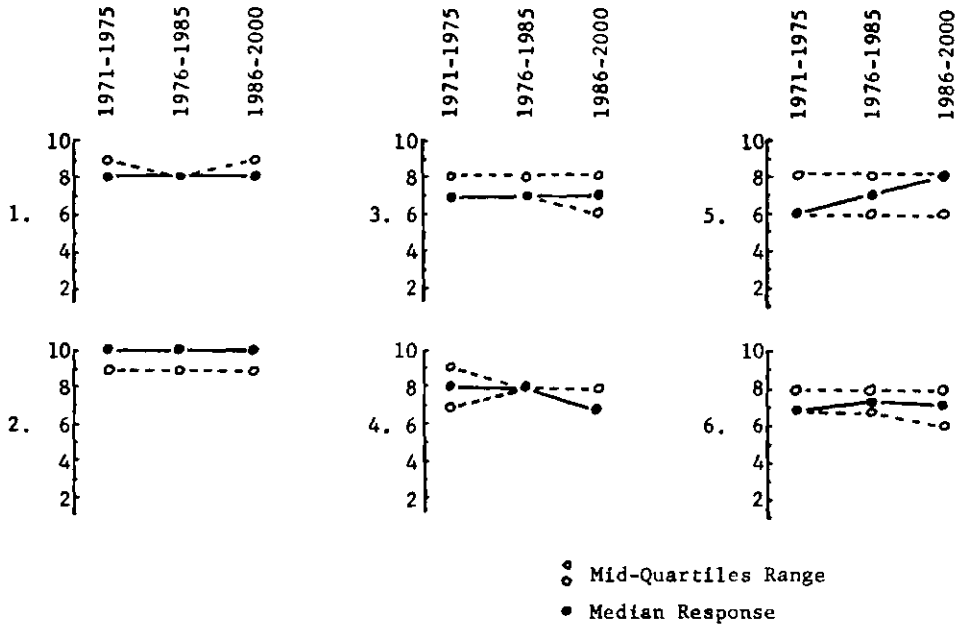
Figure 7. (Concluded).

Figure 8 presents the median and mid-quartiles range of the group judgement on the relative importance of measures of graduate education effectiveness. At the graduate level, technical competence and knowledge in a particular area (number 1) is rated relatively high, but it still falls below the capability to seek alternative solutions, make decisions, and to carry out independent investigations (number 2).

Discussion

The Delphi procedure proved an effective method for generating alternatives. The number of respondents was adequate for meaningful group statistics, and the wide range of backgrounds and experience represented by the respondents provide qualitative assurance that the alternatives generated adequately reflect possible futures for the University.

Although perhaps efficient for the respondents in that considerable information on a wide range of aspects of the University was collected with relatively small commitments of their time, the procedure was quite time-consuming for the study director. Editing, condensing, and arranging responses from the questionnaires for feedback on subsequent questionnaires required intensive effort in short periods of time in order that the total duration of the study be short enough to maintain the interest and continuity of the respondents. Subsequent studies might be conducted more efficiently. Certainly some procedures could be improved based on learning from this study, but the greatest gain should be possible through a reduction in the scope of the study. In retrospect, the results of the sections of the questionnaire on student attitudes and the effects of education, although interesting, are not essential to the generation of an initial list of alternatives for the



1. Technical competence, skills and knowledge, in a chosen academic field; professional or advanced skills; narrow specialization

   Research skills and ability; ability to build existing knowledge to develop further knowledge; ability to use knowledge to select fruitful areas for research

2. Capability to make decisions; ability to seek alternative problems solutions; capability to distinguish between carefully reasoned or researched conclusions and meaningless verbiage

   Independence of thinking, individuality, independence; dependence; capability to discipline one's own thinking, to carry out independent investigations, to work in areas of speciality without control

3. Persistence, ability to accomplish sustained intellectual work, to work hard for long periods of time; mechanization; capability to do disciplined, long-termed creativity; renewal capability, a capacity for reassessing one's intellectual position and making necessary adjustments based on empirical observation; creativity

4. Synthesizing capabilities; ability to establish relationships, to generalize

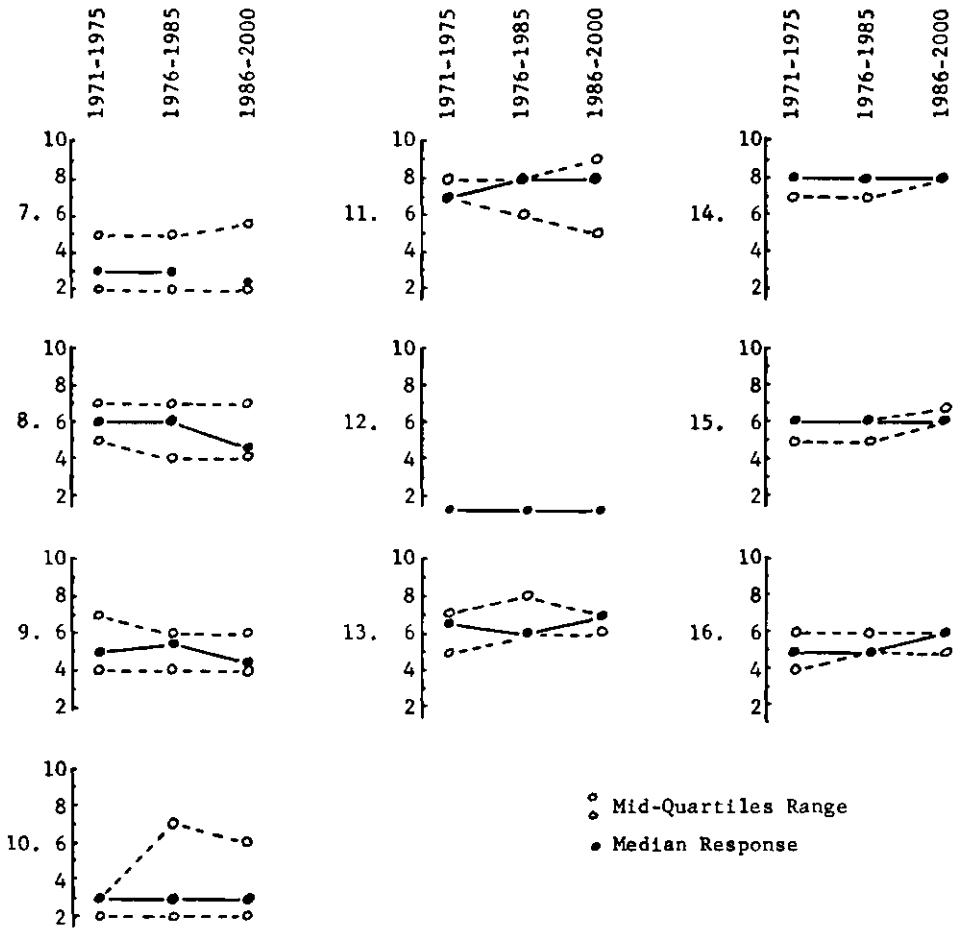
5. Scope of interests; broad professional interests; general accumulation of knowledge

   Ability to work with others, especially in interdisciplinary groups; ability to accept and carry out responsibility, to use power and authority; leadership ability

6. Teaching ability; ability to interact with students, to do creative teaching

   Ability to communication in writing and verbally; ability to communicate expertise to others who are not experts

Figure 8. Relative Importance of Graduate Student Characteristics.



7. Self-assurance, self-confidence; elitism, feeling of confidence that one knows it all

8. Internalization of scientific method; identification and excitement with learning process; acceptance of the idea that scholarly aims are quite acceptable goals; commitment to a generally inquiring or research posture

9. Specific professional ideals

10. Degree of socialization, degree to which the student accepts the values of society

11. Attitude toward other persons and toward society; social conscience; awareness of, and interest in, problems facing humanity; ability to relate self, society, culture, and an awareness of responsibility

12. Apathy

13. Sense of reality; degree of sophistication; degree of naivety

14. Maturity; social and individual maturity

15. Sensitivity and aesthetic qualities

16. Idealism

Figure 8. (Concluded).

University. These sections could have been eliminated, resulting in little loss of relevant information and in less study time and effort.

The use of the study results in the remaining steps in the procedure of generating alternatives is described in the sections which follow. Using conclusions drawn directly from the study results should be done only with care; interpretation of the results should be based on the purpose and scope of the study. For example, the results suggest that the University will be expected to fulfill more roles to a higher degree in the future than in the past. This does not necessarily suggest that it is advisable for a particular individual university to attempt to fulfill more roles or a wide range of roles. Instead, this result should be interpreted as suggesting that the genotype, the collection of individual American universities, will be expected in the aggregate to fulfill more roles to a higher degree in the future than in the past.

Identification of Associations

Results by Systems Levels

The first step in the association identification task is to list by systems levels the results of the Delphi study. Each result of the "Roles" section of the study is an alternative at the human system level and therefore these results are already categorized. Because the results of the section on "Effects of Education" do not contribute significantly to helping identify strategic alternatives, they are not analyzed further. This step thus reduces to categorizing the innovations and trends (Figures 5 & 6) and listing them under appropriate systems levels headings.

The categorization of results may be accomplished by one of two equivalent methods. One method is to proceed one systems level at a time and scan the results, comparing the outcomes with organizational characteristics corresponding to that level. The other method is to proceed one result at a time, comparing the outcome with the characteristics of each systems level. For the first method, each outcome which typifies an organizational characteristic at the level being considered is categorized as a result at that level and listed with other results under the same heading. The scanning is repeated for the next level until all levels have been considered and all results have been categorized.

The two methods are equivalent because each yields a categorization and listing by systems levels of the results of the Delphi study. As discussed in Chapter III, the systems levels collectively form a comprehensive framework, therefore every result may be placed within at least one systems level. The subsequent steps in the procedure require only that there be a comprehensive listing of results by systems levels, thus both methods of categorizing the results are equivalent.

The second method has the advantage of being easier to display. Its application to the categorizing of six Delphi results is illustrated in Table 7 and in the text below. The vertical lines in Table 7 were drawn to help distinguish the separate columns.

The Delphi result of the "Reemergence of Presidential Leadership" (I-4) corresponds to the formal organization aspect of the University and to its static structure. The result also may be viewed as corresponding to an alternative internal environment for the University.

Table 7. Categorization of Delphi Results by System Levels

System Level and Characteristics		Delphi Study Result*					
		I-4	I-12	I-25	T-3	T-10	T-14
Framework:	Formal organization	X					
	Static structure	X					
	Plant/facility/location charts						
Clockwork:	Routine, periodic formal procedures	X	X	X		x	
	Frequent, taken for granted activities		X	X			
	Methods of conducting activities		X	X			x
Thermostat:	Decision-related processes					X	x
	Policies and decision rules					X	
	Feedback system aspects					X	
Cell:	Boundary						
	Inputs/outputs		x	x			x
	Internal/external environments	x			X		
Plant:	Heritage aspects	x					
	Functional parts						
	Organizational classification aspects						
Animal:	Organizational purpose		x				X
	Information gathering and processing			x			
	Image of environment				x		
Human:	Identity, self-image						
	Societal role						
	Communications with other organizations						x
	Expressive behavior						
Social:	Individual members' social behavior						
	Internal social arrangement						
	Informal organization						

X = categorized as a result at this systems level. x = related to this level.

*I-4: Reemergence of Presidential Leadership; I-12: Diverse Degree Tracks; I-25: Widespread Use of TV Cassettes; T-3: Tightening Job Mkt. for Professionals; T-10: Environmental Concern and Emphasis on Dynamic Equilibrium; T-14: Politicization of University.

The use of the word "reemergence" recalls that this result can be related to early leadership styles in the University, thus it corresponds to heritage aspects of the organization. Correspondences between the result and organizational characteristics thus exist at the framework, cell, and plant systems levels. Because the result seems most strongly related to the framework aspects of the organization, it is categorized and listed at this system level.

The Delphi result "Diverse Degree Tracks" (I-12) includes alternative degree arrangements which possibly permit less strict and more flexible credit requirements. This result therefore corresponds to the routine, formal procedures of certifying a student as having fulfilled the requirements for a degree and to the normal methods of conducting activities of education. Because this result may produce a different kind of graduate, it is related to the input/output aspects of the University. The possibility of diverse degree paths also raises the issue of the purpose of the University. This result therefore corresponds to characteristics at the systems levels of clockwork, cell, and animal. Because it has such a strong relationship to the clockwork aspects of the organization, it is categorized as a result at this level.

The "Widespread Use of TV Tape Cassettes," result I-25, is a result which suggests the extensive use of convenient audio-visual information packages. This result relates to routine procedures, to frequent activities which are taken for granted, and to methods of conducting educational activities. The information in the tapes can represent input/output aspects of the University and the information gathering

and processing characteristics of the organization. This result thus is related to organizational characteristics at the clockwork, cell, and animal systems levels. Because of the extensive correspondence between this result and organizational characteristics at the clockwork level, it is categorized at this level.

The Delphi respondents perceived a trend of a "Tightening Job Market for Professionals" (T-3). This result helps characterize an alternative future external environment for the University and is related to the University's image of this environment. Thus this result is related to the cell and animal level organizational characteristics. Because it seems primarily a characterization of the external environment in which the University may be operating, this result is categorized at the cell level.

The Delphi respondents identified a trend toward "Environmental Concerns and Emphasis on Dynamic Equilibrium" (T-10). This trend suggests that the University might have a routine, periodic procedure for dealing with environmental concerns. It corresponds to decision-related processes which consider long term and dynamic effects of decisions, to policies and decision rules based on equilibrium effects, and to the feedback systems aspects of the University. This result therefore is related to the clockwork and thermostat systems levels of the University. Because dynamic equilibrium and feedback systems are closely related, this result is categorized and listed under the thermostat system level.

The "Politicization of the University" (T-14) is a result related to the methods by which the University conducts its activities. This result indicates the involvement of the University in governmental

decision-related processes and indicate the kinds of outputs the University might produce. The result is related to the issue of the purpose of the University and to the means of communication with other organizations. These relationships thus indicate that this result corresponds to the organizational systems levels of clockwork, thermostat, cell, animal, and human. Because the result seems closely related to the issue of the University's purpose, it is categorized at the animal level.

The discussion above and Table 7 illustrate the categorization procedure for six Delphi study results. The other results are categorized in similar fashion, and the complete listing of the results by systems levels is given in Appendix J.

Related Outcomes

The next step in the identification of associations is the identification of sets of related outcomes. This step, shown in Figure 2 (Chapter V), consists of a systematic search among the study outcomes for results which are related directly or indirectly to a common human level alternative.

The human level alternatives (primary alternative University roles) are examined one at a time by considering the implications of implementing this alternative: What other alternatives identified by the Delphi study (innovations, trends, roles) are implied by this implementation? What alternatives may be required (necessary) for this implementation? What other alternatives might be facilitated by the implementation? What other alternatives might be inhibited by the implementation? What alternatives might inhibit this implementation?

The results of the Delphi study as arranged by systems levels (using Appendix J) are scanned for answers to these questions. When a result is identified as a valid answer to one of the questions, this result is examined by the same procedure: the other results are scanned for answers to the same questions. The procedure is continued until each human level alternative has been examined. The procedure followed in this task can be illustrated with a few examples.

The role of "retrainer," for example, implies that the University will provide "processes to retread," with an emphasis on correcting mature obsolescence rather than teaching immature individuals (Innovation No. 17). Shifting attention to this innovation, the existence of mature students in the University implies the alternative of "changed roles for professors" (Innovation No. 32) in a new social environment. Such a change, however, would require (i.e., be facilitated by) the existence of "machine tutors" (Innovation No. 21) to remove some of the teaching load from professors. The "changed role for professors," if implemented, would also facilitate the University fulfilling the role of "Innovator of New Methods of Problem Solving" (Role No. 25); professors and mature students could jointly participate in innovative organizations and methods of examining problems.

In scanning the lists for answers to the second question, no alternatives are identified as being directly facilitated by the implementation of the role of retrainer. Similarly, no results are identified as being directly inhibited by or as inhibiting the implementation of this role. Scanning the lists of Delphi results for answers to the third question, however, identifies the "need for continuing

education and retraining" (Trend No. 20) as being necessary for the University to implement the role of retrainer. Successful implementation would require that the role fulfill an external need or demand for the retraining offered.

The second alternative role, "Professional Manpower Producer," is examined in the same manner. No other alternative is implied or inhibited by the implementation of this alternative. However, the implementation could facilitate the University being a "Social Interface" (Role 21), since the activities of producing trained manpower are compatible with maintaining a varying reservoir of manpower whose level can be related to the levels of external demand for particular skills. The implementation of the role of manpower producer would require "diverse degree tracks" (Innovation No. 12) in order to provide the diversity of graduates needed in an increasingly complex professional environment. However, the implementation of this role would be inhibited by the "Tightening Job Market for Professionals"; an oversupply of professionals would inhibit the further production of additional manpower. In scanning the lists of results for other outcomes related to these three associated results, no second order associations are identified.

The alternative role of "Educator of Revolutionaires" (Role 14) illustrates that the search procedure may identify incompatible alternatives as well as mutually compatible alternatives. Because the term revolutionary means one who advocates total or radical change, the University's acting as an educator of revolutionaires would appear to inhibit its being a socializing agent (Role 8), in which role the

University would prepare students to understand, accept, and live in an existing social arrangement. Similarly, if the University acts as an educator of revolutionaries, this would likely inhibit its acting as a social servant (Role 17) and being responsive to the demands of society. In scanning the Delphi outcomes for answers to the other questions, the implementation of the role of educator of revolutionaries implies the politicization of the University and the University's performing as a political force (Role 10). The existence of the possibility of a revolution and the University acting on this possibility implies a divergence of objectives as viewed by the University and as viewed by those outside the University. Examining each of these results, the politicization of the University would inhibit the University performing the role of "Reference, Authority, and Unbiased Source of Information" (Role 11), since the "taking sides" implied by politicization would cast doubt on the degree of objectivity and would restrain widespread acceptance of an authority.

The role, "Educator of Liberal Arts" (Role 5) implies the possible purpose of education to discover the potential of man, since the Liberal Arts are not necessarily oriented toward training but rather toward culture, science, history, etc. The role also implies (or could facilitate) the University acting as a "supporter of culture" (Role 20), since many of the activities of education and support could overlap. If the University performed the role of supporter of culture, the undergraduate student would be exposed to a variety of experiences -- that is, implementation of the role of supporter of culture implies that undergraduate education would include a variety of experiences. This

latter result would be facilitated by the University's being a communiversity (Innovation 28, a human level alternative). The University's being an integral part of a community, with no well-defined boundaries to separate the community and the University, would result in students as a natural consequence of their education would experience, and probably participate in, a variety of activities.

The above examples illustrate the method of search which is used to identify the results associated with each human level alternative. The results of these searches are diagrammed in outline form in Appendix K. These outlines use the keyword from the question which identified the association to preface the related alternative. For instance, the above example of the results associated with the role of "retrainer" is diagrammed as follows:

Retrainer:

Implications: - Processes to retread (mature students into University)
Implications: - professors' role changed
Requires: - machine tutors
Facilitates: - Innovator of new methods of problem solving (role 25)

Necessary: - Need for continuing education

This diagram is typical of the diagrams in Appendix K for each alternative and illustrates that scanning the Delphi results for outcomes related to the alternative University role of "retrainer" yields one outcome which is implied by the implementation of the role and one outcome which is necessary for the role's implementation. The implied outcome (processes to retread) itself implies another Delphi study outcome, the possibility of changed roles for professors. This outcome,

in turn, requires machine tutors and facilitates the University's assuming the role of Innovator of New Methods of Problem Solving. The other diagrams in Appendix K provide similar information on the other alternative roles for the University.

Remote Associations

The results of the previous step, as given in Appendix K, because they identify remotely associated alternatives, suggest combinations of alternatives which may be synergistic or incompatible. Referring to the example used in the section above, the two alternative roles of "Continuing Educator, Retrainer" and "Innovator of New Methods of Problem Solving" are related through the former role's implying processes to retread mature students, which in turn implies the changing of professors' role, which would facilitate the University's fulfilling the latter role ("Innovator..."). The linking relationships are all positive, that is, one result implies, facilitates, or requires the next result; therefore, these two remotely associated roles are potentially synergistic. The remotely associated roles and the linking relationships may be diagrammed to illustrate the systems levels relationships of the results which act as links for the alternative roles. Such a diagram for the above example is shown in Figure 9.

Figure 10 illustrates the systems level relationships of results relating to the role, "Educator of Revolutionaries." The diagram shows that the implementation of this role would inhibit the University's fulfilling the roles of "Socializing Agent" and "Social Servant" but would imply a "divergence of objectives" and the University's

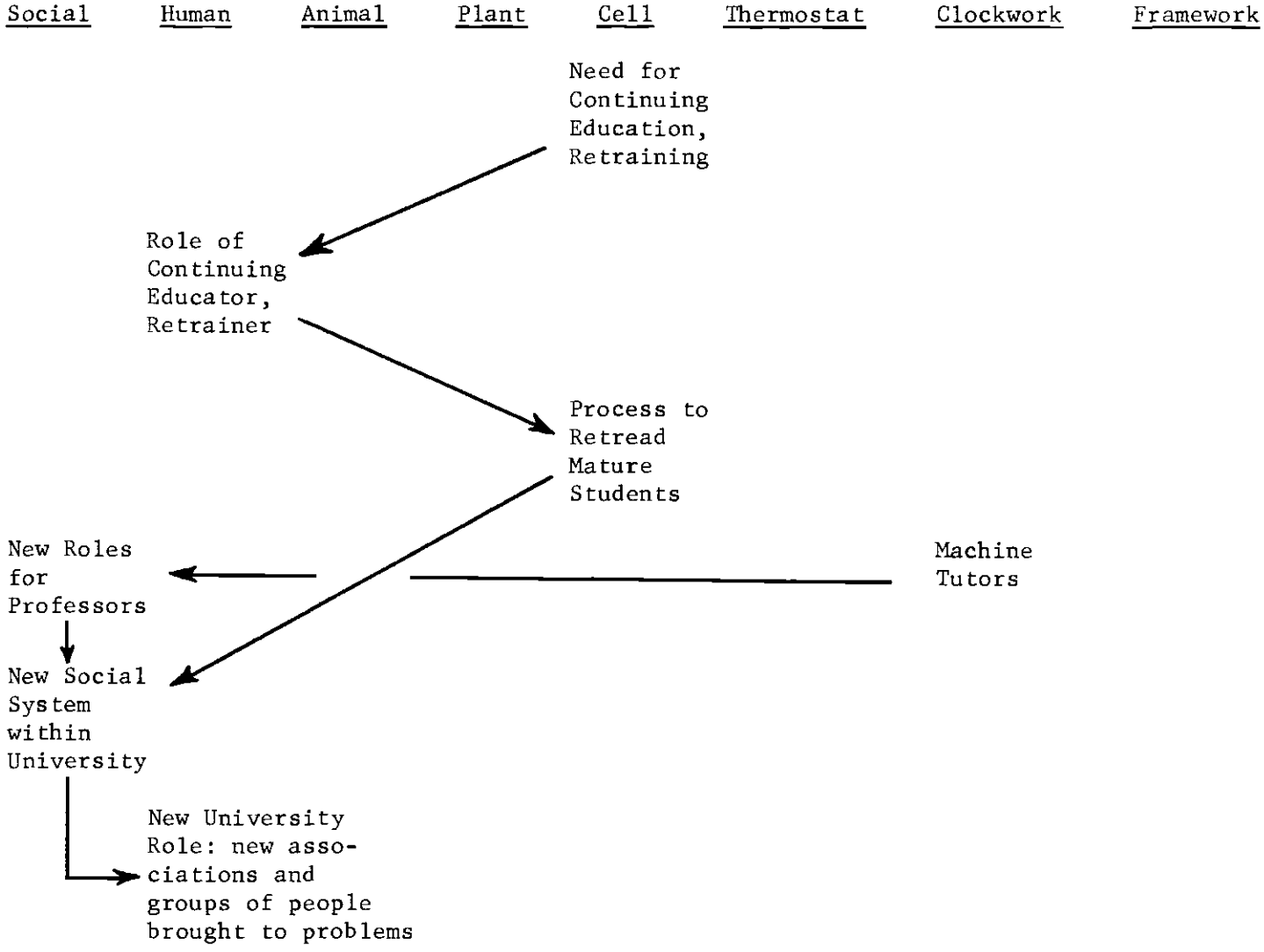


Figure 9. Remote Association: Retrainer/Innovator of New Methods of Problem-Solving

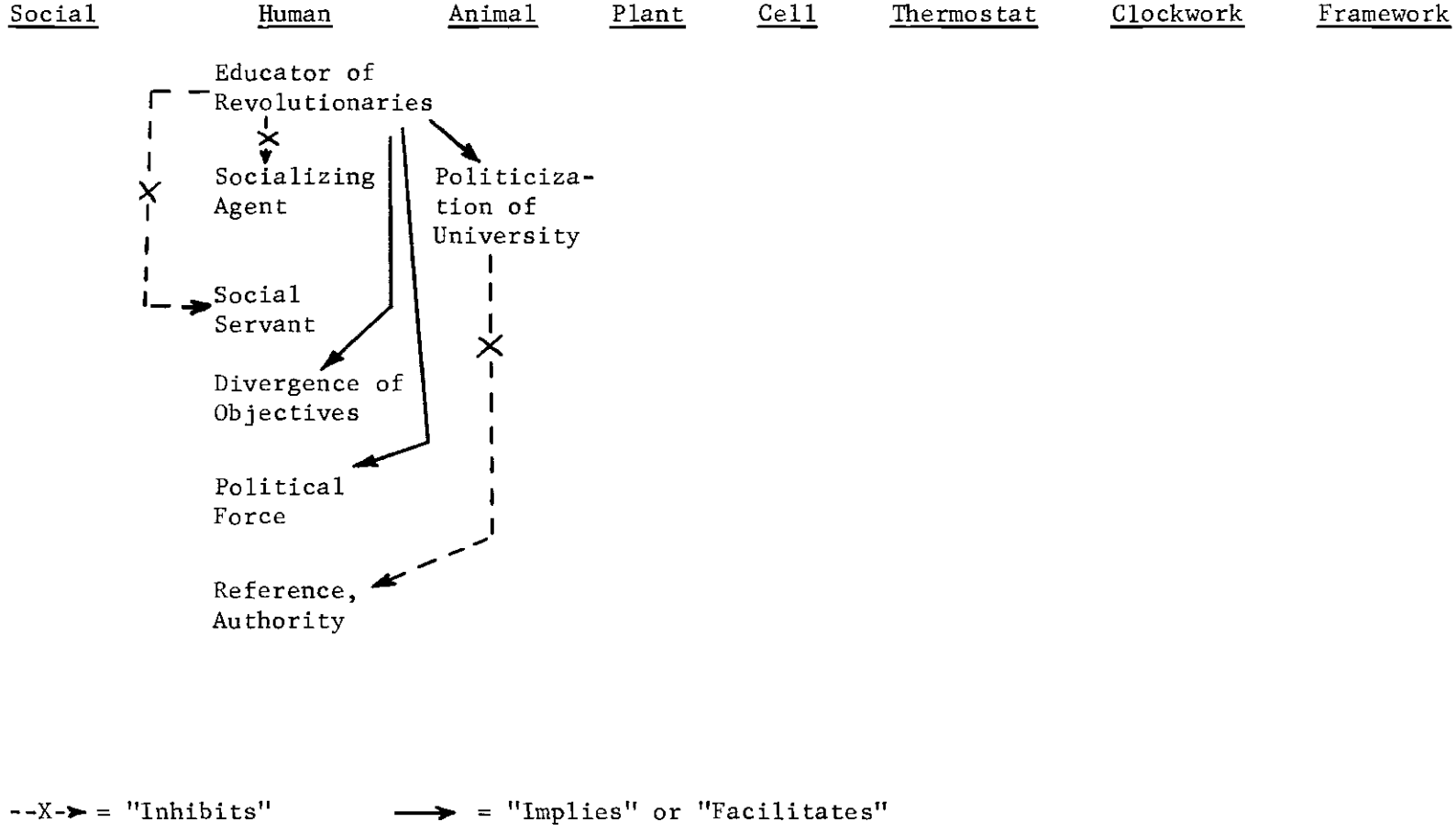


Figure 10. Remote Association: Educator of Revolutionaries Inhibits Reference, Authority

acting as a "Political Force." The implementation of the role of "Educator of Revolutionaries" would remotely inhibit the University's fulfilling the role of "Reference, Authority" through an implied politicization of the University, which, in turn, would tend to preclude public trust in the objectivity of the University. Thus the remote association in this case is an inhibitory, or conflicting, association; the roles of "Educator of Revolutionaries" and "Reference, Authority" appear to be incompatible.

Figure 11 illustrates the systems level relationships of results relating to the role, "Educator for the Liberal Arts." The diagram shows that this role and the role of "Supporter of Culture" are compatible; the latter is implied by the forms. Implementation of the role of "Educator for the Liberal Arts" implies the purpose of "education to discover the potential of man," which implies a variety of experiences for the undergraduate student. This latter condition would be facilitated if the University were a "communiversity," being an inseparable part of the surrounding community. Because each linkage between "Educator for the Liberal Arts" and "Communiversity" is an implication or facilitation type of relationship, these two alternatives are compatible and potentially synergistic.

It may be noted that the diagrams in Figures 9-11 provide no additional information beyond the information contained in the lists of results by systems levels (Appendix J) and in the outline of associations (Appendix K); these diagrams merely display the previously derived information in another format. The results of the analysis important for the evaluation step in planning are the identification

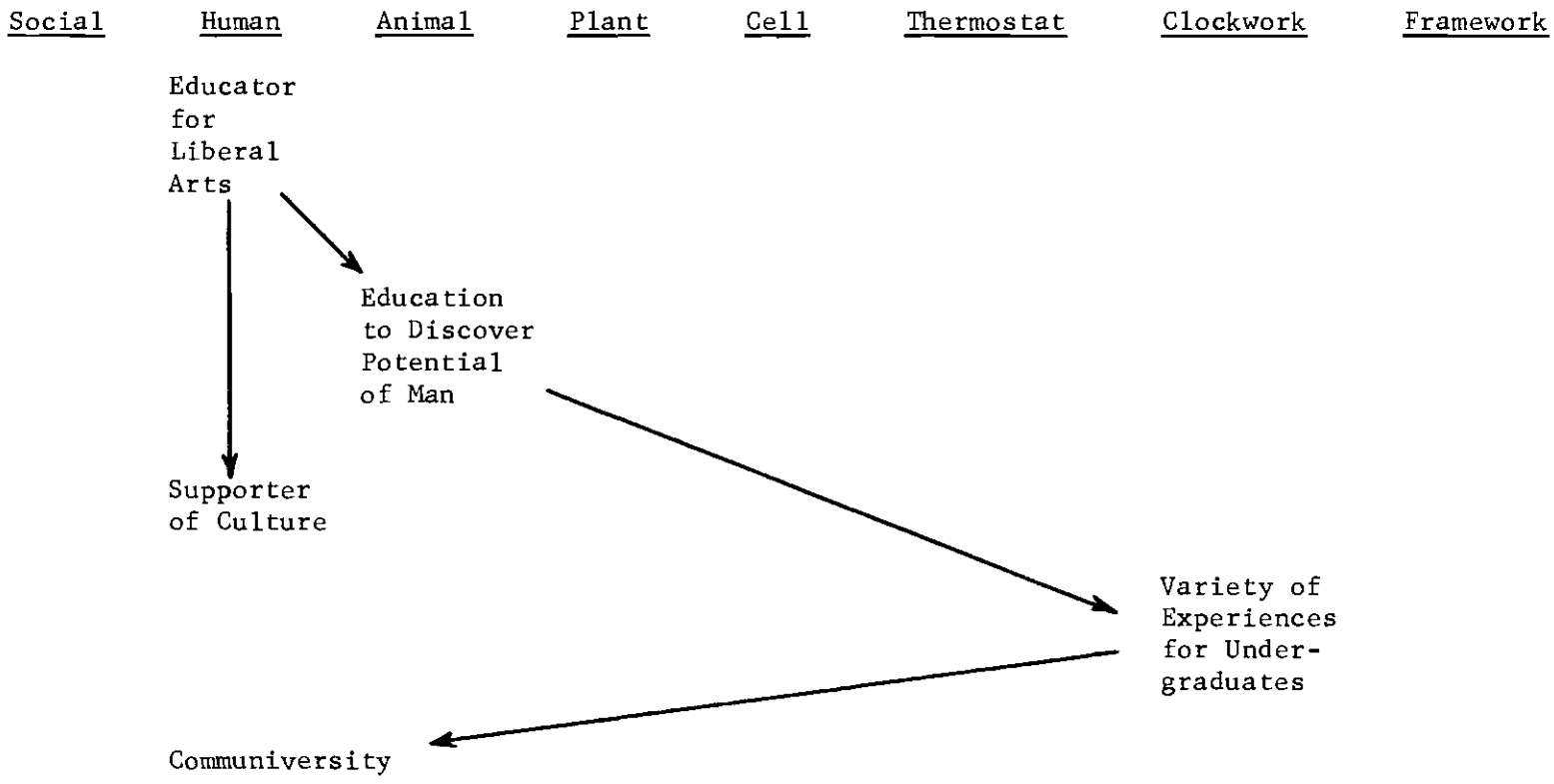


Figure 11. Remote Association: Educator for Liberal Arts/Communiversity.

of sets of compatible and potentially synergistic roles and the identification of sets of incompatible roles. These results are obtained by applying the analysis illustrated above to each alternative, summarizing the relationships among alternative roles by listing the compatible and incompatible roles. The sets so identified are shown in Tables 8 and 9. The sets of roles shown in Table 8 represent combinations of alternatives which offer the potential for synergism is chosen and pursued as simultaneous goals. The sets shown in Table 9 represent combinations in which the pursuit of one role appears to inhibit the simultaneous pursuit of certain other roles.

Preliminary Evaluation

The results of the Delphi study, as presented in Appendix J, are used in two comparisons which form the basis for a preliminary evaluation of the alternatives. The first comparison is with the results of the initial diagnosis of strategic University issues and determines the adequacy of the set of University alternatives generated by the above process. The second comparison consists of comparing the anticipated impacts of the implementation of individual alternatives with the characteristics of a healthy organization.

Comparison with Diagnosis

The overall initial diagnosis judged the University to be in the initial stages of maturity, and therefore the results of the Delphi study should, on the whole, address the critical concerns of a mature organization -- concerns of uniqueness, adaptability, and contributions to society. The design of the Delphi study, by focusing attention to

Table 8. Potentially Synergistic Combinations of Alternatives

Retrainer (1)*/Innovator of New Methods of Problem-Solving (25)

Professional Manpower Producer (2)/Social Interface (21)

Educator of Revolutionaries (4)/Political Force (10)

Educator for Liberal Arts (5)/Supporter of Culture (20)/Communiversity (I-28)

Mass Educator-Practical Things (6)/Communiversity (I-28)

Socializing Agent (8)/Social Interface (21)

Reference, Authority (11)/Critic, Evaluator (12)/Problem Definer, Societal Adviser (13)/ Social Servant (17)/Applied Researcher (19)/Innovator of New Methods of Problem Solving (25)/ Basic Researcher (18)

Originator, Stimulator of Alternatives (14)/Applied Researcher (19)/Innovator of New Methods of Problem-Solving (25)

Executor of Pilot Projects (15)/Communiversities (I-28)

Implementor of Large-Scale Projects (16)/Communiversities (I-28)

Social Servant (17)/Applied Researcher (19)/Innovator of New Methods of Problem-Solving (25)

Basic Researcher (18)/Reference, Authority (11)

Applied Researcher (19)/Innovator of New Method of Problem-Solving (25)

Operator of Communications Media (24)/Entertainer (23)

*Numbers in parentheses refer to role numbers as given in Figure 3.

Table 9. Incompatible Alternatives

Educator of Revolutionaries (4)* inhibits

- Reference, Authority (11)
- Socializing Agent (8)
- Social Servant (17)

Political Force (10) inhibits

- Reference, Authority (11)
- Critic, Evaluator (12)
- Problem Definer, Societal Adviser (13)
- Social Servant (17)
- Basic Researcher (18)

*Numbers in parentheses refer to role numbers as given in Figure 3.

alternative societal roles, assured that the results addressed these concerns at the human level. The particular concerns at each of the systems levels are compared with particular study results (Appendix J) at each of the systems levels and discussed below.

Framework. The issue initially diagnosed was the flexibility of the University framework. The potential elimination of the autonomy of the department (I-5) and challenges to the departmental structure (T-11) are results which address this issue.

Clockwork. The issues of modes of instruction, evaluation, and certification are addressed by the study results of emphasis on educational technology (T-4), machine tutors (I-21), potential elimination of the grading program (I-10), diverse degree tracks (I-12), and informal learning (T-17). The issue of a built-in mechanism for modifying these procedures is addressed by the application of PPBS and other management systems (I-6), participatory organizations, (T-12) and participatory decision-making (I-7).

Thermostat. The issue of feedback from the environment is addressed by the application of PPBS (I-6), environmental concern and emphasis on dynamic equilibrium (T-10), and participatory organizations (T-12).

Cell. Input/output balance is addressed by study results of emphasis on dynamic equilibrium (T-10), funding gaps (T-25), and other results at the cell level.

Plant. The formation and dissolution of specialized parts is addressed by the application of PPBS (I-6), challenges to departmental structure (T-11), elimination of the autonomy of the individual

departments, (I-5) and new organizational structure (I-8).

Animal. The anticipation of the results of activities is addressed by the application of PPBS and other management systems (I-6) and participatory organizations (T-12).

Human. The definition of the University's self-image is addressed by the listing of the alternative roles and the identification of new forms for the University such as the communiversity (I-28).

Social. The issue of disunity and unrest among members of the University is addressed by participatory decision-making (I-7), participatory organizations (T-12), and divergence of objectives (T-5).

Based on the general, overall comparison of the study results with the initial diagnosis and on the level-by-level comparison of the study results with the initially perceived issues, it is therefore concluded that the results adequately address the concerns represented by the initial diagnosis.

Comparison with Characteristics of Health

Each of the human level alternatives is discussed from the viewpoint of the anticipated effects of implementing the alternative; other effects may result from the implementation. Both the required and resulting effects are discussed in relation to the characteristics of a healthy organization given in Table 3C. Because the purpose of this comparison is to determine which alternatives appear likely to make possible a healthy organization and therefore which alternatives warrant more detailed study, the comparison discussion does not include the depth or detail of the next step in the planning process, the evaluation step.

In the text below, combinations of alternatives which are compatible and potentially synergistic (Table 8) are discussed together.

Retrainer (1)/New Methods Innovator (25). This alternative would require a framework sufficiently well-defined to assure the consistency and continuity of particular retraining programs but sufficiently flexible to permit changes in response to changing retraining needs. To fulfill the role of innovator of new methods of problem-solving, the framework would necessarily have provision for such temporary organizations as task forces or working groups.

At the clockwork level, additional routine information-gathering and processing would be necessary to determine retraining needs and to identify problems. Routine procedures would need to be established for providing both learning and administrative information to students who are mature adults.

The routine information from the University's environment would need to be integrated into a feedback system which permits the University to know how well its retraining programs are meeting the needs for which they were designed. Also at the thermostat level, well-defined internal decision systems would be needed for determining when particular organizational parts, programs, courses, and material becomes out of date and needs to be replaced or discarded.

At the cell level, the costs of the retraining programs will need to be determined and the income from charges will need to balance these costs. Individual universities may identify their greatest strengths and develop retraining programs unique to these capabilities.

At the plant level, retraining needs and problems to be solved

will require specialized groups which rarely, if ever, exist in the current University. A totally new functional part of the organization is needed to formulate the methods of organizing and attacking a problem. The information and decision systems at the clockwork and thermostat levels will specify organizational units which need to be phased out.

The knowledge structure of the external environment, particularly as it reflects the expected needs for retraining and as it permits the anticipation of the impact of a particular retraining program, would need to be developed. This knowledge structure development would depend on the successful implementation of the systems for gathering and processing information about the external environment.

At the social system level, implementation of the role of retrainer would result in older, more mature students. The additional maturity and experience of the students and the potential implementation of machine tutors can result in a student-faculty social relationship which is more balanced than the relationship between a young, immature post-high school student and the faculty which is currently typical. Adoption of the role of innovator of new methods of problem solving may stimulate the formation of temporary associations among faculty and students, and traditional social relationships (e.g., by department) may become less dominating.

In summary, the roles of Retrainer and Innovator of New Methods of Problem-solving, if implemented, could result in University characteristics which are consistent with the characteristics of a healthy, mature organization. These roles and the combination represent potential

of the Delphi study was the perceived trend of a tightening job market for professionals increasing in the near term but reversing after 1976, (Figure 6, No. 3), suggesting that this role of the University may be inhibited by factors in the external environment until after 1976.

New specialized parts, reflecting the needs of new professions, would be required for the University to fulfill the professional manpower production role. Organizational units serving professions which no longer need new professionals would have to be phased out.

An expanded knowledge structure of the external environment, resulting from improved information about professions and their future needs, is necessary. The anticipation of both near term and long term results of actions and activities -- for example, the implementation of a new professional training program -- would use this knowledge structure as a basis.

At the social system level, the shared commitment of members of the University would need to be to the general role; professional groups within the overall organization may have parochial interests within their own professions.

In summary, the roles of professional manpower producer and social interface could be implemented and result in characteristics which parallel the characteristics of a healthy organization. The detailed evaluation, however, should investigate carefully the environmental context of this role through 1976 and the information systems and knowledge structure which would be required for successfully updating how the role is fulfilled.

Educator of Leaders (3). This role implies a well-defined

goals which should be evaluated further by individual universities.

Professional Manpower Producer (2)/Social Interface (21). This alternative would require a University framework which would support the production of professional manpower and be responsive to the needs of the professions. Because the professions are not necessarily motivated to demand or suggest change from past traditions, the flexibility of a structure for the production of trained professionals is not assured. The current college and departmental structure of the University is a well-defined structure which has a professional manpower production orientation.

At the clockwork level, regular procedures for the collecting of information on the needs of the profession and the needs of those who are served by the professions would be necessary. Existing information sources such as simple extrapolation of past trends as determinants of professional manpower needs would not provide the required information. Diverse paths of study, leading to many different degrees, would be necessary.

Feedback mechanisms to review the adequacy of professional services and to modify and improve professional education based on the results of such reviews would be necessary. The mechanisms would provide for the contributions of information from the professions and from those served.

At the cell level, the professional training will have to be funded through some mechanism which assures an input/output balance. From the long-term perspective, the mechanism may need to assure balanced inputs which are economically nondiscriminatory. One result

structure which may be expected to exhibit clear hierarchies with capable leaders. At the clockwork level, this role would probably require a standardized procedure for selecting, recruiting, and evaluating applicants. Feedback systems that determine the actual effectiveness of the leaders produced would be necessary in order that the educational process could be continuously improved.

Choosing this role implies that the social environment in which the University operates is a meritocracy in which individuals become leaders on the basis of learned competence. An issue at the cell level which would be resolved explicitly or by default is that of the set of values which the University would impart to the students. The resolution of this issue is important because of the implied power which the University graduates would have.

Specialized organizational units would be necessary to adequately resolve the issues of merit, values, and role performance. Because of the potential long-term influence of such units, individual membership might need to be based on some means such as rotation or election, designed to assure that the long-term public interest is served.

At the animal level, implementation of this role would require the development of a knowledge structure which would permit the University to anticipate the effect of its leadership education and to make choices which permit other organizations in the environment to develop their full potential.

In summary, the preliminary evaluation of this role indicates that its implementation implies organizational characteristics which

could parallel the characteristics of a healthy organization. Mechanisms and knowledge for the continuing resolutions of issues such as student selection and values would be critical, however.

Educator of Revolutionaries (4)/Political Force (10). The implementation of this role is incompatible with the implementation of some other roles and thus constrains the strategic choices available to the University. The implied politicization of the University inhibits its being a reference, authority, and source of unbiased information. The revolutionary stance is also incompatible with the roles of socializing agent and social servant, since the University cannot simultaneously transmit traditional culture and advocate revolution and cannot simultaneously and continuously be submissive to the demands of other organizations in society and be educating students for the overturning of these same organizations. It is difficult to imagine a long term input/output balance resulting from the implementation of this role. By their nature, revolutionary actions create temporary imbalances, thus a continuing revolutionary role would seem to imply continuing imbalance at the cell level.

In summary, this role is incompatible with the fundamentals of organizational health. If this role were implemented as a continuing role of primary importance the University would not be expected to exhibit characteristics of a mature, healthy organization.

Educator for the Liberal Arts (5)/Supporter of Culture (20)/Communiversality (I-28). At the framework level, this role implies a structure oriented toward the languages, history, philosophy, etc. Structural flexibility, although necessary to help perform as a

communiversity, would not be as critical as in some other roles.

At the clockwork level, this role offers the possibility of routine, standardized courses in classical and traditional subjects. Feedback mechanisms at the thermostat level would be required to assure the continued level of learning, to permit consistent certification of graduates, and to permit the continuing interaction with the community.

At the animal level, one purpose of the liberal arts education may be to discover the potential of man, in contrast to the purposes implied by other roles which are more immediate and more technically oriented. In fulfilling this role, the University can also act as a supporter of culture, thus providing cultural organizations and artists the opportunity to develop their potentials. This implies that an undergraduate student may be exposed to a variety of experiences, and this variety may be further enlarged by the University choosing to assume the role of a Communiversity and be an integral part of the community in which it is located.

In summary, these roles, if implemented either individually or collectively, could yield the characteristics of a healthy, mature organization and are therefore worthy of further evaluation.

Mass Educator-Practical Things (6). This role implies that many students would be associated with the University, therefore there is a requirement for efficient operations. At the clockwork levels, machine tutors could permit the efficient transfer of facts and knowledge to the students. Routine and standard courses would be required to permit "mass" education.

At the thermostat level, information systems would be necessary

to continually evaluate the effectiveness and efficiency of the courses and the teaching/learning mechanisms and to assist in improving the educational process. A feedback system also would be necessary to identify what subjects continue to be practical, which become out of date, and what new subjects to include in the curriculum.

At the cell level, the concept of mass education is likely to result in the acceptance of the universality of the college degree; enrollments would increase. Because of the emphasis on practical things, the University may produce outputs in terms of knowledge and service which would be of immediate utility by the surrounding community, particularly if the role of communiversity is assumed along with the role of mass educator.

The use of machine tutors, necessary for mass education, implies that the professor's role will change. This may result in a less status-oriented social system within the university. The role of communiversity and the resulting interaction with the community might further this type of social system.

In summary, the implementation of either the role of "mass educator-practical things," or the role of communiversity, or both, could result in organizational characteristics consistent with the characteristics of a healthy, mature organization. These roles therefore warrant further consideration and evaluation.

Mass Educator--How to Think (7). As in the above mass educator role, this role implies the use of machine tutors, an emphasis on efficient education of large numbers of students, and the acceptance of the universality of the college degree. This role also implies an emphasis

on the problem-solving approach, thereby requiring standard methods and procedures at the clockwork level for students to learn to think by solving problems.

As the role above, implementation of this role could yield a university having characteristics consistent with the characteristics of a healthy organization. This role is therefore worthy of further study and evaluation.

Socializing Agent (8)/Social Interface (21). The implementation of the role of socializing agent implies a framework based on tradition and past social arrangements. Clockwork level procedures would be necessary to admit students and transmit to them the culture of preceding generations. Feedback systems would be necessary to maintain past standards and to assure that the graduating student to some extent has successfully absorbed and adopted the cultural traditions; inputs to the decision-making process would be primarily from history and past policies.

This role does not require for its fulfillment characteristics consistent with health at each of the systems levels. Because the University could fulfill this role and still not have the characteristics of a healthy organization, this role by itself is an inadequate alternative for the University.

Advisor, Counselor, "Tracker" (9). This role would require the University to provide individualized advice and specific information selected for individual students. Clockwork procedures would be required for testing or otherwise making visible information about the individual and for determining the vocational needs and opportunities

in the external environment.

Feedback from graduated students would be necessary to determine how satisfied they are with their vocation, thus providing a means of evaluating how well the role of advisor and counselor is being performed. Through successive or continual evaluation, a knowledge structure of the external environment would be developed and would permit the impact of the counseling activities to be anticipated.

Although it is unlikely that this role would be the only role performed by the University, the characteristics resulting from the implementation of this role are consistent with the characteristics of a healthy organization. The evaluation step should therefore include the alternative of counselor and advisor.

Reference, Authority (11)/Researcher (18,19)/etc. (Refer to Table 8.) This collection of compatible roles would require a framework sufficiently stable and well-defined to permit the execution of long term basic research projects but sufficiently flexible to permit the University to be responsive to particular societal problems and to set up short-term problem task forces or similar groups. The existence of efficient and regular procedures for storing and accessing information is necessary.

The concepts in these roles are consistent with the concept of regular self-examinations, and the successful implementation of the roles would require well-defined means of obtaining feedback information from the external environment. The outputs of the University would be information which other organizations can trust as unbiased and authoritative; groups who benefit from the information and therefore

who would support the University's performance of this role would include industry and agencies of government.

New functional parts would be created in response to evidences of changing need; nonfunctional parts of the organization would have to be phased out. The continual interaction with the environment would lead to a knowledge structure which would permit the impact of actions and activities to be anticipated.

The research and problem-solving environment within the University implies a focus on tasks and results. The social environment therefore could result in individual understanding of the University's role and commitment to this role. Professional pride, commitment to improvement, and occasional time schedules can generate a creative tension and stimulate individual self-fulfillment.

In summary, the roles in this combination imply organizational characteristics which parallel the characteristics of a healthy organization. These roles warrant further consideration in the evaluation step.

Originator, Stimulator of Alternatives (14). This role is compatible with the roles of applied researcher and innovator of new methods of problem solving and has implications similar to the combination of roles above. At the framework level, implementation of this role implies a flexible structure which permits the University to be responsive to societal problems. This role does not necessarily imply a well defined framework, however.

Regular procedures for the storing and accessing of information is needed to aid in solving problems and in the originating and

stimulating of alternatives. Feedback from the environment is necessary to determine the effectiveness of the University in this role and the effectiveness of the alternatives originated or stimulated.

Because it is unlikely that alternatives will be originated, stimulated, or needed at a constant rate, short-term input/output balances may require special fee arrangements if this role represents the only type of exchange between the University and its environment. The scope of some alternatives which the University could generate may include governmental or societal alternatives, and for such cases, fees or exchanges might be difficult to arrange.

Special groups and organizational units may be set up to perform the function of generating alternatives, and the same units may be disbanded once their functions are completed. Information about the environment, organized into a well-developed structure, is necessary if the University is to stimulate and generate relevant and meaningful alternatives.

In summary, the implications of implementing this alternative can be consistent with the characteristics of a healthy organization. However, the implementation does not necessarily imply a well-defined framework, and input/output balances may be difficult to arrange. Other roles, implemented with this role, may provide the additional requirements of a healthy organization.

Executor of Pilot Projects (15)/Communiversities (I-28). The implementation of this role requires the existence of a well-defined framework in which formal project arrangements can be made and actions taken. The framework would necessarily be flexible to accommodate

different project requirements. Regular procedures for project management would be necessary, and self-examinations and environmental studies would be required for assuring that the organization remained responsive to environmental needs and efficient in operations.

Input/output balances would be set up on a project-by-project basis, but a long term balance between the University and the surrounding community is implied by the Communiversity relationship. Different projects might require new functional units which would be set up for limited periods of time, thus nonessential parts would not continue to exist.

At the animal level, the University would necessarily develop a knowledge structure of its environment in order to be effective as the executor of projects. Because of the communiversity role, access to the information necessary for this knowledge structure would not be difficult. The relationship between members of the University organization and members of the community might result in a less formal and less hierarchical social system than currently exists in the University.

In summary, the implementation of this role could result in characteristics which parallel the characteristics of a healthy organization. There are no characteristics implied by this role which are inconsistent with the characteristics of health; therefore, the evaluation step should include further consideration of this role and role combination.

Implementor of Large-Scale Projects (16). Implementation of this role would require a well-defined management framework and the

existence of regular procedures for project progress reporting, accounting, etc. Flexibility would be necessary to permit the University to accommodate differences between individual projects. Decision rules and policies, based on self-examination and feedback from the environment, would be required to determine which projects can be implemented efficiently and effectively with the available resources. The use of public funds would imply highly visible mechanisms for planning, programming, and managing the projects.

Input/output balances in the near term probably would be required on a project-by-project basis. If the University is also acting as a Communiversity, longer term balances would be expected to evolve which would be less formally arranged. For large scale projects, public funds undoubtedly would be used to support the implementation, increasing the dependence of the University on these sources of funds.

New organizational functional parts implied by the implementation of this role include units which would plan, program, and schedule the projects. More management functions than exist in the current University would be necessary. These functions would be dependent on a knowledge structure of the environment which would allow the organization to anticipate the effect of actions and activities. The management functions may change the social organization, and the relationship with the community may permit individuals in the University to integrate their activities within and outside the organization. The resulting social system may, but will not necessarily, lead to an environment which permits individual self-fulfillment.

In summary, implementation of this alternative implies characteristics at several systems levels which parallel the characteristics of a healthy organization but does not necessarily result in parallel characteristics at other levels. However, since implementation does not imply results inconsistent with healthy characteristics, this role warrants further consideration in the evaluation step.

Employer. It is apparent that implementation of this role is consistent with many other roles and would result in characteristics which could be consistent with the characteristics of a healthy organization. However, this role does not imply a well-defined output at the cell level, and an input/output balance is unlikely without resolution of this ambiguity. Therefore, this role is judged inadequate by itself and should be evaluated only in conjunction with other roles.

Operator of Communications Media (24)/Entertainer (23). As an operator of communications media, the University would necessarily have a formal framework to meet Federal requirements. In order to effectively utilize different media, the framework would have to be flexible and able to be modified.

Program production necessitates regular, standard procedures, and the technical aspects of the operation (e.g., the operation of radio and television transmitters) require carefully followed procedures and standards. In order to determine the effectiveness of the programs, feedback from the environment is necessary. Successful, continued implementation implies internal evaluations to determine the efficiency of operations and the relative benefits resulting from the costs.

Implementation of this alternative implies an input/output balance, but the mechanism for funding the programs is not determined; alternatives include paid advertising and paid reception such as pay TV. Exchanges with the environment could include entertainment programs, educational programs, and programs, such as "Sesame Street," which attempt to provide both entertainment and education. Program production implies the creation of new functional units within the University, and these units may exist for the duration of the need and then be phased out.

A continuing implementation of this role implies a knowledge structure of the environment which permits the impact of alternative programs and actions to be anticipated. The continual creative task and production deadlines imply a challenging environment in which individuals could find the opportunity for self-fulfillment.

In summary, implementation of this alternative implies that the requirements at some levels are consistent with the characteristics of a healthy organization. At other levels, there are no implications inconsistent with the characteristics of a healthy organization. Therefore this alternative warrants further evaluation.

Conclusion

The preliminary evaluation showed that the results of the Delphi study adequately addressed the issues presented by the initial diagnosis. Therefore, the scope of the study was sufficiently broad, and no additional alternatives are required before the evaluation step is conducted.

The preliminary evaluation of the human level alternatives indicates that many of the roles and role combinations identified could be

pursued as goals for the University with successful implementation leading to characteristics which have been identified as characteristics of a healthy organization. The implementation of two roles appeared to imply inconsistencies with characteristics of health: educator of revolutionaires and political force. Three roles appeared to be inadequate by themselves; the implications of implementing these roles left too much ambiguity in the characteristics to assure consistency with characteristics of a healthy organization. However, combined with complementary or consistent roles, these roles could form part of a valid mission for the University. The three "inadequate" roles are: socializing agent, originator and stimulator of alternatives, and employer. The remaining roles and combinations (shown in Figure 3 and in Table 8) were shown by the preliminary evaluation to warrant further consideration in the evaluation step of the planning process.

For a particular university situation, the entire set of alternatives identified by this study might not be feasible. The constraints of a specified environment or of an individual university organization may limit the range of goals which are valid in the particular case.

CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The primary objective of the research was to show that the metaphor of the organization as a living system could be developed into a well-defined concept and used to refine a general process model of organizational strategic planning. A second objective was to illustrate parts of this process by identifying alternatives for the University.

The first part of the study examined the planning and futures literature. This examination did not produce evidence of a widely accepted and commonly acknowledged theory of planning. However, it was concluded that the literature exhibited considerable consensus on the fundamental steps or activities of planning, and these steps were identified. It was also concluded that because more recent strategic planning concepts emphasize the continuing nature of the planning functions, a basic model of strategic planning includes these fundamental activities in a dynamic feedback arrangement rather than in a rigid step-wise sequence.

The second part of the study examined the multi-level classification scheme for systems suggested by Boulding (1956) and the concept of organizational health used rhetorically by many but expressed most clearly by Bennis (1966). It was shown that an organization

exhibits characteristics corresponding to each of the levels (with the possible exception of the transcendental systems level) in Boulding's scheme and that characteristics at these levels can be used to define a healthy organization at different stages of development. It was concluded that the concepts of health and systems levels could be used to develop a more detailed model for planning. The human system level characteristics of an organization are appropriate foci for strategic planning concerns, and the characteristics which define a healthy organization provide a basis for establishing strategic issues and preferred directions for change.

The next part of the study reexamined, using the concepts of systems levels and organizational health, the basic model for strategic planning which was defined in the first part of the study. As a result of this reexamination, the basic model is expanded into a more detailed model. More detailed guidance is provided for conducting each activity, and the feedback paths are clearly identified by a flowchart of the process. It is concluded that the refined model is consistent with the general prescriptions for planning found in the literature, but has the potential advantages of providing more detailed guidance on gathering information and conducting strategic planning activities.

The next part of the study developed a detailed procedure for conducting one step in the refined model, the step of generating alternatives. The development yields a well-defined, systematic procedure which retains generality and flexibility, and it is concluded that the potential advantages of the refined planning model can be realized

conceptually by further development and definition of each step in the process.

The final part of the study applied the alternative generation procedure to the University situation. This part of the study demonstrated the procedure through the design, execution, and evaluation of a Delphi study. The demonstration included a brief assessment of the history and present situation of the University, an initial diagnosis of strategic issues, and the use of this assessment and diagnosis in an evaluation of the adequacy of the Delphi results and in a preliminary evaluation of the desirability of the different alternatives. It was found that the generated list of alternatives collectively addressed the strategic issues. It was therefore concluded that the general procedure is workable and produces adequate and feasible strategic alternatives.

Taken together, the above conclusions show (1) that the metaphor of the organization as a living system, as developed, is conceptually well-defined and useful for refining a basic general model for strategic planning; and (2) that portions of the refined model may be beneficially applied to the University. Therefore, it is concluded that the primary and secondary objectives of the research have been achieved.

Recommendations and Extensions

As a result of conducting this research, several areas and topics are recommended for further investigation and additional development. These recommendations include extensions of aspects of the

present research and additional investigations which would complement the present research and its results.

Overall Higher Weights for Future Alternatives

The results of the Delphi study section of future University roles clearly indicate that the respondents assigned higher median weights to future alternative roles than to past University roles. Results of the other sections did not have such an unmistakable bias toward higher future weightings, but these sections did not directly compare past and future aspects of the University. In order to better understand and interpret futures studies which make use of opinions, it is recommended that studies be undertaken to investigate the mechanism by which the future is perceived and the characteristics of these perceptions. Are the higher weights on future roles a result of a universal bias or optimism about the future of established organizations? Or is this only one type of bias, and would a different set of respondents have different and even opposing biases? For example, how might the future be perceived by black militants, white supremists, individuals from under-developed or developing countries, etc.? It is apparent that perceptions of the future are important aspects of the decision-making process, but the overall question of what influences and effects these perceptions of the future needs further research.

Utility of the Alternatives for Individual University

This research, through the application of the procedure to generate alternatives, yielded a list of strategic alternatives which contained potential solutions to the issues identified as facing the class of organizations designated the American University. This list

presumably contains alternatives which would be feasible for individual universities, but not every alternative in the list would be feasible for every university. It would be interesting to use the list in one or more particular university planning situations to verify (or refute) the assumption that a list of alternatives generated by considering the genotype is a valid list of alternatives for individual organizations of the genotype.

Specific Application to Individual Organization

This research has demonstrated the conceptual validity and operational capability of the refined process model for strategic planning. Additional verification and understanding of the model would be possible by utilizing the model to design and implement a planning process in a particular organization. Because some work has already been done for the University, application of the process to a particular university campus would be an effective extension of this research. Since not all alternatives are expected to be feasible for a particular university, an early step in the research would be to identify constraints or fixed characteristics of the particular university which would constrain the list of alternatives or which would be the basis for placing priorities on the alternatives.

Metaphor's Appeal and Behavioral Utility

An underlying assumption of this research is that the metaphor of the organization as a living system is an intuitive, easily adopted concept which managers could utilize without extensive preparation and training. Informal feedback from the Delphi respondents on the usefulness of the concepts of "roles" suggests that this assumption is valid.

However, this premise would appear to be a testable hypothesis, and if established as true, it would mean that wider use of the metaphorical concept might yield improved organizational planning.

Minimum Number of Systems Levels

This research utilized Boulding's comprehensive hierarchy of systems levels in developing the refined model for strategic planning. The results establish that this set of systems levels is sufficient for strategic planning, but the research did not attempt to identify the levels necessary for strategic planning. Are all these levels necessary? Or could the planning be accomplished using fewer levels? A mathematical formulation might be needed to establish a minimum number of systems levels which would satisfy the strategic planning requirements, and such an approach might lead to a process model for strategic planning which is equally effective but more efficient than the model described in this dissertation.

Hierarchical Decision Structures and Systems Levels

Although not established as necessary, it was shown that the human level aspects of an organization help define the strategic issues and alternatives for an organization. The refined model reflected the tacit assumption that the human systems level of an organization was in a sense superordinate to the other systems levels of the organization. Boulding used the systems levels to define a hierarchy of systems distinguished by relative complexity; it would appear to be a valid and an interesting approach to use the systems levels (or some minimum set of systems levels defined by other research) as a formal hierarchical decision structure for strategic planning, tactical

planning, and operations and control for an organization.

Descriptive Approach to Planning

This research on strategic planning is essentially a prescriptive approach to establishing a valid and useful general model for planning activities. A descriptive approach would be equally valid and complementary to the approach in this research. It is recommended that the following method be considered for descriptive research into the nature of strategic planning.

First, a retrospective search should be undertaken to identify particular cases which (perhaps representing the consensus of a panel of experienced strategic planning researchers or perhaps even military "strategists") might typify "good," "outstanding," "poor," or "catastrophic" strategies or strategic decisions. One "good" or "outstanding" case, for example, might be the auto pricing strategy of GM's Alfred P. Sloan. Next, each of these cases should be examined and compared to identify (1) what conceptual methods, if any, led to these decisions and strategies, and (2) what methodological, contextual, or participant factors, if any, are common to the good and outstanding decisions and to the poor and catastrophic decisions.

A descriptive study, such as this recommendation or some other research approach, is a desirable adjunct to prescriptive studies. Strategic planning theory remains predisciplinary in nature, and, as in similar fields, much basic work remains if it is to become more than an art of experienced and acknowledged individuals.

APPENDIX A

Initial Letter

ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE of TECHNOLOGY

ical Sciences Division
225 North Avenue N. W.
Atlanta, Georgia 30332
(404) 873-4211 Ext.5625

January 4, 1971

Dear Sir:

During the past few years I am sure you have observed many changes in your school, in other universities, and in our society. Many of these changes seem appropriate and make us optimistic about the capability of an institution to effect renewal; others cause us concern about the future of the university and even about the future of our society.

I am presently doing some research which is directed toward this concern about the future, and I would like your help in a Delphi study on alternative university futures. In addition to being part of my dissertation, the study is designed to provide information in a useful form for those whose decisions and views help shape the future of the university.

As you may know, the Delphi technique is a method for eliciting and refining group judgments. It has three essential features:

- Anonymous response--opinions are obtained by questionnaire
- Iteration and controlled feedback--respondent interaction is effected by a systematic exercise conducted in several iterations, with carefully controlled feedback between rounds
- Statistical group response--the group opinion is defined as an appropriate aggregate of individual opinions on the final round.

These features tend to minimize the biasing effect of dominant individuals, of irrelevant communications, and of group pressure toward conformity. Unlike a respondent in an "opinion survey", a Delphi respondent has the opportunity of interacting with the other respondents (through feedback), learning new information, and refining his own views as the study progresses.

In this study, you would be one of approximately twenty respondents. The group will include university presidents and faculty members (from universities with strengths in science and engineering), students, elected and

appointed government officials at both the state and national levels, administrators of government and industrial research laboratories, organizational and behavioral scientists, and those who are concerned with educational technology. There will be a total of four iterations, and each questionnaire will be designed to be completed in a matter of minutes (not hours). Questions will focus on the alternatives which face the university: its role in society, the effects of university education on students, and its organizational structure. Later questions will evaluate the impact of these alternatives on present-day decisions and policies.

I hope that you will agree to participate in this study; you can make a unique contribution and I believe the exercise will be mutually beneficial. A prompt decision and the prompt return of the enclosed card will help my planning and would be appreciated.

In spite of much effort, letters such as these sometimes are not very satisfying. If this is the case with this one, please call me collect: (404) 873-4211, extension 5664.

Many thanks.

Sincerely yours,

Robert M. Mason

Robert M. Mason

Enclosure

Check one:

___ I am willing to serve as a respondent in the study of university futures. I understand that my name will not be mentioned during the study or in a final report without my consent.

___ I am not willing to serve as a respondent.

NAME_____ Phone_____

ADDRESS_____

_____ (Zip)_____

COMMENTS:_____

_____

APPENDIX B

Questionnaire 1

SUGGESTED PROCEDURE:

WITHOUT DELAY:	1. Scan the entire questionnaire. 2. Schedule a time to respond to the questions, time requirement for this questionnaire is estimated to be _____minutes. 3. Complete and return the enclosed card.
At the time you have scheduled:	1. Write your responses to the questions. 2. Return the completed questionnaire in the enclosed envelope.

QUESTIONNAIRE 1

Study of University Futures

This study is concerned with the university and with the factors which may have a major influence on its development. (University is defined as an "institution of higher learning which provides facilities for teaching and research--in particular, one made up of an undergraduate division which confers bachelors degrees and a graduate division which confers masters degrees and doctorates.") You will be asked on this questionnaire for your perceptions of basic factors related to the university, and later questionnaires will ask you to consider further the factors generated by you and the other respondents. The questionnaire and subsequent questionnaires in the study are not designed to be a test of your knowledge nor as a test of social influence.

In answering this questionnaire, you may find the following guidelines helpful:

1) Before beginning to answer the first question, scan the entire questionnaire. Before beginning a particular section, read carefully the introduction to that section.

2) When generating a list, a set of factors, or a set of alternatives, do not attempt to give a refined "theoretical set", but simply record those items that come easily to mind. Similarly, if asked to rank order a list, do not take too long to determine the arrangement. You will have an opportunity to revise your judgments in succeeding questionnaires.

3) You are specifically asked to respond to those sections marked with a (red) penciled check. You may respond to as many or as few of the other sections as you desire.

4) Feel free to comment on any phase of the study. A place is provided at the end of this questionnaire for your comments or you may call me, collect, at (404) 873-4211, ext. 5664. (Or, in the late evening , at (404) 261-0873.)

UNIVERSITY ROLES

Universities may be viewed as providing certain functions in society and acting to fulfill certain assigned or assumed roles. In this question, we are interested in alternative roles the university might play. For example, one role the university might play is that of "mass educator", in which the university provides higher education for all who apply. Another role the university might play is that of "social servant", in which the resources of the university are on call for application to particular community or social needs when the demand arises. Note that we are not requiring that the university must play a particular role, but rather we are concerned with what roles the university might play.

List at least three, but no more than ten, such alternative roles. Use a word or short phrase to identify the role, then add additional words or a short sentence to further describe what you have in mind.

After making this list, place an "L" beside any of the roles which you believe to be relatively less important than the other roles.

Alternative Roles

STUDENT ATTITUDES

Student attitudes have exhibited both positive and negative aspects during recent years. In reflecting on the factors which effect these attitudes, one might identify factors related to diverse aspects of the student's environment. For example, one factor might be "rigid curriculum requirements"; another example might be "students' perceptions of current foreign policy."

List at least five, but not more than ten, factors which you believe to be important determinants of student attitudes.

When you have finished the list, rank order the factors in decreasing order of importance: place a "1" beside the most important, a "2" beside the next most important, and so on.

INNOVATIONS

Institutions can be strongly affected, sometimes in unexpected ways, by technological innovations and by innovative organizational forms. Similarly, particular technological or organizational innovations may be necessary for an organization to effect needed changes.

For your particular area of interest, think of innovations which may have a great impact on the university and which you believe are likely, urgently needed, or feasible. (Consider the next thirty years as the time period of interest.)

List at least three, but no more than ten, such innovations. Use a word or short phrase to identify the innovation and add additional words or a short sentence to further describe what you have in mind.

TRENDS

Instead of considering discrete events which, by themselves, may have a great impact on the university, consider how patterns or trends of (related) events may influence the development of the university. Taken singly, or viewed over a short period of time, the events may appear insignificant, but viewed as a pattern which may extend over a longer period, these trends may seem important--perhaps as incentives, perhaps as constraints--to the development of the university. One example of such a trend might be the increasing number of businesses which are becoming education-oriented; another example might be the increasing cost per student of a university education; still another might be the rising public concern with questions of environmental quality and ecological balance.

For your particular area of interest, list at least three, but no more than ten, trends which you perceive as being extremely important in the development of the university over the next thirty years. Use a word or short phrase to identify the trend, then add additional words or a short sentence to further describe the trend you perceive.

EFFECTS OF EDUCATION

Think of the process of higher education as a series of experiences occurring to the student, with subsequent changes in the student. Imagine comparing the student before and the student after this series of experiences in terms of a set of characteristics which may or may not have changed, and consider an evaluation of the educational process which takes into account these characteristics. In this section, we are concerned with deciding which characteristics of the student should be included in this evaluation. We are allowing for the possibility that some of the changes are desirable and some undesirable. An example of a desirable change might be an increase in skills; an example of an undesriable change might be a narrowing of intellectual outlook. Note that we are not implying that any particular desirable or undesirable effect must occur, rather we are concerned with the general characteristics which might change and which should be taken into account in evaluating the higher education process.

For concreteness, consider the undergraduate process (time between entering college and having a bachelor's degree) separately from the graduate process (time between entering graduate school and having a master's degree or a doctorate).

For each of these processes, list at least five, but no more than ten, such characteristics. Use a word or short phrase to identify the characteristic, and add additional related words or a short sentence to further describe what you have in mind. After you have listed the characteristics, rank order them by placing a "1" beside the most important, a "2" beside the next most important, and so on.

UNDERGRADUATE - List of Characteristics

GRADUATE - List of Characteristics

Comments:

I have received and scanned questionnaire_____.

(check one)

_____ I will complete and return the questionnaire before the desired date (_____).

_____ I cannot complete and return the questionnaire by the desired date; I expect to return it before_____ _____.

APPENDIX C

Questionnaire 2

SUGGESTED PROCEDURE:

WITHOUT DELAY:

1. Scan the entire questionnaire, including the description below.
2. Schedule a time to respond to the questionnaire; the time requirement is estimated to be _____ minutes for those sections checked with red pencil. (You do not have to respond to the entire questionnaire; unchecked portions are included for your information.)
3. Complete and return the enclosed card.

At the time you have scheduled:

1. Write in your responses to the questions.
2. Return the completed questionnaire in the enclosed envelope.

QUESTIONNAIRE 2

Study of University Futures

The first questionnaire in the study produced a wealth of material, and I have spent some time in trying to condense this material and still preserve all the important aspects.

This questionnaire includes the edited, condensed responses to Questionnaire 1. Because these responses came from separate individuals, they may appear in many cases to be mutually inconsistent--in concepts and in wording. Similarly, because I have attempted to preserve subtle distinctions, many responses may appear not to be mutually exclusively--that is, there may be considerable overlap between "different" items.

The purposes of this questionnaire are:

1) to permit further condensing and compaction of the responses to Questionnaire 1.

2) to provide guidance in the selection of items for further investigation in Questionnaires 3 and 4.

In answering this questionnaire, the following guidelines may be helpful:

1) Before beginning to answer the first question, scan the entire questionnaire. Before beginning a particular section, read carefully the introduction to that section.

2) In responding to questions, do not take too long to make your decision; you will have the opportunity to revise judgments in the succeeding questionnaires.

3) You are specifically asked to respond to sections marked with red pencil. You are encouraged to respond to as many of the other sections as you desire.

4) You are encouraged to comment on any phase of the study; make comments on this questionnaire, or you may call me collect at (404) 873-4211, extension 5664, or in the late evening at (404) 261-0873.

ALTERNATIVE UNIVERSITY ROLES

The roles suggested by you and other respondents to the first questionnaire are listed below in four broad categories: educator, social change agent and social servant, researcher, and miscellaneous. The roles characterized may not be mutually exclusive; neither are they necessarily mutually consistent. However, a description of that role which you believe should be the primary role of the university should appear somewhere in the list.

On this questionnaire you are requested to scan this list of roles and add under "comments" any role appropriate to the university which you believe has been omitted in the list. Next, consider each role individually. Imagine that it has been taken as a primary role--that is, taken as a mission of top priority--by the university (ignore, for the moment, the overall desirability of this role for the university), and consider two questions:

1. What roles in the list are so compatible with this role and so interrelated with this role that they become (or could become) primary roles? If you identify such roles, list these (by number) in the column labeled "compatible roles".

2. What roles in the list are so incompatible with this role that they cannot be satisfactorily fulfilled--fulfilled to any appreciable degree--if the given role is assumed to be a primary role? If you identify any such roles, list these (by number) under "excluded roles".

Role	Compatible Roles	Excluded Roles
Educator		
1. Retrainer, upgrader of skills, continuing educator		
2. Professional manpower producer, educator of the professionals, educator of specialists . .		
3. Educator of leaders -- intellectual leaders, most advanced sector of society; trainer of a leadership elite		
4. Educator of revolutionaries		
5. Educator for the liberal arts		
6. Mass educator--everyone is taught how to think, how to learn		
7. Mass educator--teacher of practical things: personal health, personal finance, craft skills		

Role	Compatible Roles	Excluded Roles
8. Socializing agent--transmitter of culture to succeeding generations, preparation of the youth to live in an increasingly complex world		
9. Advisor, counselor, "tracker"--collect, advise, and steer students (of all ages) into training for vocations that offer them the greatest satisfaction; job placement		
Social Change Agent; Social Servant		
10. Political force--enforcer of federal law, collector of information on individuals for law enforcement agencies, reactor and responder to government action on social issues, selective emphasis and distribution of information ("power broker") .		
11. Reference, authority, "unbiased" source of information		
12. Critic, evaluator--of status quo, of existing practices, of proposed developments		
13. Problem definer, societal advisor--articulator of social, individual or group needs		
14. Originator, stimulator of alternatives--alternatives to the status quo, specific suggested problem solutions		
15. Executor of pilot projects--demonstration projects, which may originate within or outside universities		
16. Implementor of large-scale programs of social change--investment in community projects, executor of mission-oriented interdisciplinary programs		
17. Social servant--"on call"; resources available on demand, irrespective of type of request; community center, military/industrial servant, other public service		
Researcher		
18. Basic researcher--originator and evaluator of ideas and concepts (goal is increased understanding); generator of knowledge; research is only indirectly oriented toward perceived needs		

Role	Compatible Roles	Excluded Roles
19. Applied researcher--developer of applications of existing knowledge; engineering development; research emphasis is a solution to defined problems and the application of existing technology to new opportunities		
Miscellaneous		
20. Supporter of culture--locus of activity; supporter, particularly of the fine arts		
21. Social interface--buffer; a holding tank for matching bulges in population and trained manpower to job openings and manpower needs . . .		
22. Employer--the provider of useful activity for trained educators, researchers, others.		
23. Entertainer--extensions of past subprofessional sports (for example, football) into other areas; performer of the fine arts for the viewing public, etc.		
24. Operator of communications media--tv, radio, etc., can be operated for educational and other purposes		

COMMENTS:

STUDENT ATTITUDES

Responses to the first questionnaire suggested many factors that may be important determinants of student attitudes. On this questionnaire, you are requested to evaluate the relative importance of the suggested factors and to identify those factors which appear to be closely related.

First, scan the entire list and select the factor you believe to be most important as a determinant of student attitudes. In the column labeled "relative importance," assign to this factor a "10". Assign to each of the other factors a weighting by comparing it with this most important factor; a factor half as important should be assigned a "5", and so on. The same weighting may be assigned to more than one factor, and decimals as well as whole numbers may be used.

Next, consider each factor once again. If you identify other factors in the list which seem to be strongly related to this factor (the factors are inseparably interrelated, or seem to be parts of a common factor), list these factors (by number) in the column labeled "related factors".

Factor	Relative Importance	Related Factors
1. Intrinsic attitudes--as the student attempts to escape from parental restraints, prior disrespect for past accomplishments of society; underestimating problems of the future; lack of commitment to train himself to make improvements		
2. Atmosphere of self-determination--opportunity for independent thought, lack of value structure. .		
3. Clarity of goals and objectives--institutional and personal.		
4. Change from parental permissiveness to institutional rigidity--conduct codes for students, relationships with parents, carry over of controls over his social freedom from lower school and parents		
5. Selection process for entry into the university		
6. Disappearance of the common man's immortality--the possibility of making the world a better place to live in for one's grandchildren seems remote		

Factor	Relative Importance	Related Factors
7. Disappearance of both physical and intellectual frontiers		
8. National policy--draft, Vietnam, foreign policy, domestic policies, perceived trend of increasing government control		
9. Nuclear warfare possibilities		
10. Attitude of national leaders to youth; pontification by members of the "establishment" . . .		
11. Fashions in "intellectual snobishness"		
12. Perceptions of hypocrisy in others, especially adults		
13. Social concerns--perceived racism; race riots; environmental pollution; unemployment		
14. Perceived capability to effect reform--to change current political and social situations; failure to understand the fly wheel analogy; efforts to speed up fly wheel of society do count, but effort to make noticeable change is quite prodigious		
15. Personal concerns--relationship of one's self to society, lack of secure feeling about one's personal future		
16. Rapidity of social change; changes in value, changing from one era to another, "future shock" and rapid technological change		
17. Complex information environment--effectiveness of mass communication media, quick molding of attitude and opinion, lack of a filter which permits one to distinguish among information with different value and manipulated information, the exposure of failures to live up to advertised ideals		
18. The education and attitude of parents		
19. The process of physiological development--different than in former times		
20. Failure to comprehend competitive society--the pervasive determination of some individuals to impose their will over others		

Factors	Relative Importance	Related Factors
21. Societal emphasis on the need for an education--college becomes something that is required . . .		
22. Perceived insufficiency of appropriate roles for women who are college graduates		
23. Current attempts to make education relevant . .		
24. Discrepancy between high expectation and actual experiences of higher education		
25. Obsolete material--the idealization of history and the American dream in textbook is contradicted by experiences		
26. University location--urban or rural		
27. Commitment to excellence by the institution--especially top rank institutions		
28. Campus culture and tradition--reputation of student activism, students' perceptions of acceptable social behavior; need to rebel and the guilt generated by this need		
29. University emphasis--liberal art or science and engineering; support of national causes (defense), institutional and individual roles in society (filling slots); roles perceived differently by student and by institution; lack of identity with the university as an institution		
30. Cross section of fellow students--social and racial composition of student body; lack of diversity.		
31. Attitudes of fellow students--exaggerated contact with peer groups and restricted contact with other social groups; depression and apathy breeding depression and apathy; mass psychology; contagious nature of activism, perceived connections between past, present, and future students . .		
32. Relationships with faculty; teaching methodology--a faculty unaware of events outside the campus; the degree of faculty dedication to openess, searching etc.; separation of faculty and administration from students' problems; faculty composition (perceived on occasion as being misfits from the outside world)		

Factors	Relative Importance	Related Factors
33. University inflexibility--impersonality of institutional structure; rigidity of policies and procedures; bureaucratization; lack of opportunity to actively and meaningfully take part in university government		
34. Rigid curriculum requirements--coupled with grading, degree requirements; antiquated curriculum vs student's needs; lock-step educational processes for what is essentially an individual learning process		
35. Present curriculum--within disciplines, not matched to real perceived problems; more demand for "education" and less demand for "training"		
36. Need for external objectives--opportunities for service such as Peace Corps, Vista, involvement in urban and environmental problems; preoccupation with ideas and beliefs and little outlet for social action; need for experiences to recognize the "why" of a course		
37. Increased personal affluence		

COMMENTS:

8

EFFECTS OF EDUCATION

UNDERGRADUATE AND GRADUATE CHARACTERISTICS

You are again asked to think of the process of higher education as a series of experiences referring to the student, with subsequent changes in the student. Consider evaluating the educational process in terms of these changes in characteristics. The first questionnaire requested that you identify characteristics which should be included in this evaluation. The characteristics suggested are given below. Note that in some cases both negative and positive aspects are included in the same characteristic.

In this questionnaire, you are asked to rank these characteristics according to their importance using the following procedure: look over the undergraduate list and pick the characteristic you believe to be the most important in an evaluation of the educational process. In the column labeled "relative importance", assign a "10" to this characteristic. Assign each of the other characteristics a number by comparing this most important characteristic. For example, a characteristic which you perceive as being half as important as the most important characteristic would be assigned a "5", and so on. You may assign the same weight to different characteristics, and decimals as well as whole numbers may be used.

After each item has been assigned a number, go over the list again. For each characteristic, scan the list to see if there are other characteristics that seem to be strongly related or which seem to be encompassed by this characteristic. If such strongly related characteristics are identified, list these (by number) in the column labeled "related characteristics".

Follow the same procedure for responding to the list of graduate characteristics.

UNDERGRADUATE CHARACTERISTICS

Characteristic	Relative Importance	Related Characteristics
1. Communication skills (both verbal and written); competence of personal interaction		
2. Sensitivity to aesthetic qualities		
3. Knowledge of liberal arts		
4. General accumulation of knowledge; an awareness of the complexities and range of phenomena . . .		
5. Social maturity; ability to relate to society; revolutionary perspective; a sense of time and history		

Characteristic	Relative Importance	Related Characteristics
6. A sense of reality; selfawareness, awareness of stress and limits, awareness of own ability and interests; ability to relate self, society, and culture		
7. Individual maturity		
8. Awareness of, and interest in, problems facing humanity		
9. Social habits; behavior related to personal health and environment		
10. Attitude toward other persons; tolerance, understanding, and respect for different attitudes, values, and beliefs; self-respect		
11. Breadth and scope of interests; interests in and ability to engage in activities beyond one's job		
12. Skills in abstraction and symbolism; ability to evolve original mathematical problems.		
13. Ability to generalize; ability to visualize interrelationships (particularly among disciplines); ability to foresee results of actions; perceptiveness and ability to think about complex topics .		
14. Bureaucratic sophistication, ability to work in and around large organizations		
15. Alienation (from parents and society); disillusionment		
16. Specific skills in a major area (within a discipline);		
17. Ability to understand how new knowledge is developed		
18. Ability to utilize existing knowledge		
19. Ability to work in any situation		
20. Analytic skills, ability to approach problems logically, objectively, and persistently; capability for problem analysis and solution; ability to organize intellectual material; ability to think critically, to make judgments on issues, to select the best or worst from alternatives and to seek new alternatives . .		

Characteristic	Relative Importance	Related Characteristics
21. Intellectual maturity		
22. Ability to bear responsibility, to assume and use authority, to comprehend and use power		
23. Ability to set goals and attain them, to discipline one's thinking		
24. Response to authority, capability to do an assignment neatly and on time without questioning the reasoning behind assignment		
25. Creative capability		
26. Dependence, individualism; capability for self-definition and motivation		
27. Acceptance of responsibility for individual action and social consequence		
28. Degree of socialization, degree to which the student accepts the values of society		
29. Set of values based on reason; commitment to objectivity, rational opinion, and a questioning attitude; understanding of the relationship between information and quality of judgment . . .		
30. Respect for, identification and excitement with, learning process and continued learning; motivation to learn		
31. Capacity for further learning; ability to undertake life-time learning programs, time required to gain new skills		
32. Research skills; capability of doing graduate work		

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GRADUATE CHARACTERISTICS

Characteristic	Relative Importance	Related Characteristics
1. Technical competence, skills and knowledge, in a chosen academic field; professional or advanced skills; narrow specialization		
2. Synthesizing capabilities; ability to establish relationships, to generalize		
3. Capability to make decisions; ability to seek alternative problem solutions; capability to distinguish between carefully reasoned or researched conclusions and meaningless verbage		
4. Research skills and ability; ability to build existing knowledge to develop further knowledge; ability to use knowledge to select fruitful areas for research		
5. Independence of thinking, individuality, independence; dependence; capability to discipline one's own thinking, to carry out independent investigations, to work in area of specialty without control		
6. Persistence, ability to accomplish sustained intellectual work, to work hard for long periods of time; mechanization; capability to do disciplined, long-termed creativity; renewal capability, a capacity for reassessing one's intellectual position and making necessary adjustments based on empirical observation; creativity		
7. Ability to work with others, especially in interdisciplinary groups; ability to accept and carry out responsibility, to use power and authority; leadership ability		
8. Scope of interests; broad professional interests; ability to work outside one's specialized field; general accumulation of knowledge		
9. Self-assurance, self-confidence; elitism, feeling of confidence that one knows it all		
10. Teaching ability; ability to interact with students, to do creative teaching		

Characteristic	Relative Importance	Related Characteristics
11. Ability to communicate in writing and verbally; ability to communicate expertise to others who are not experts		
12. Internalization of scientific method; identification and excitement with learning process; acceptance of the idea that scholarly aims are quite acceptable goals; commitment to a generally inquiring or research posture		
13. Specific professional ideals		
14. Degree of socialization, degree to which the student accepts the values of society		
15. Attitude toward other persons and toward society; social conscience; awareness of, and interest in, problems facing humanity; ability to relate self, society, culture, and an awareness of responsibility		
16. Apathy		
17. Sense of reality; degree of sophisitication; degree of naivety		
18. Maturity; social and individual maturity		
19. Sensitivity to aesthetic qualities		
20. Idealism		

COMMENTS:

INNOVATIONS

In this section, you are requested to consider the innovations suggested in the responses to Questionnaire 1 from the standpoints of their impact on the university, their desirability, and the probability that they will be successfully developed.

For each postulated innovation, imagine that it has been developed and implemented and consider its subsequent impact on the university--on the role of the university, on the effectiveness of the university, and on the mechanisms by which the university fulfills its role(s). Rate the overall impact as either great: large or long-range modification of role(s), substantial changes in effectiveness, etc.; moderate: readily evident changes in role(s), effectiveness, or mechanisms; or slight: little impact, of little long-range significance, etc.

Next, for each postulated innovation, consider the overall desirability of implementing the innovation, and rate each as extremely desirable: urgently needed, great contribution, etc.; extremely undesirable: likely to have grave consequences, etc.; or other: not falling at either extreme.

Finally, for each postulated innovation, consider the overall feasibility (political, technical, etc.) of its being developed and implemented within the next thirty years. Rate each as either high (for example, having a probability of .75 or more), moderate (having a probability between .25 and .75), or low (having a probability less than .25).

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Postulated Innovation	IMPACT If Implemented: Great	Moderate	Slight	DESIRABILITY Of Implementing: Extr. Desir.	Extr. Undesir.	Other	FEASIBILITY Within next 30 years: High	Moderate	Low
1. New Language: development which, with portable machines, would permit anyone to speak in any language and receive a printed text readable by all; one written symbol language for any spoken input language									
2. 30-Hour Work Week									
3. Mass Computer Utilities: computer terminals in homes will be as common as telephones are today									
4. Re-emergence of presidential leadership: strong leadership in setting goals and defining objectives; wider discretionary power									
5. University Reorganization: the elimination of the autonomy of individual departments.									
6. Application of "Planning-Programming-Budgeting System" to Universities: more critical definitions of costs, benefits; applications of systems concepts and computer-based information systems to support decision-making, administration, and management of the university									
7. Participatory Decision-Making: new forms of organization that will permit the legitimation of interaction between those holding diverse views.									
8. New Organizational Structure: increased control by faculty and students, less by administration; incentives for university government to be more responsive to "consumers" of education									
9. Doctoral Program with emphasis on teaching: professors would have the function of instructing rather than research and publishing									
10. Elimination of Grading System: perhaps replaced by system of "pass/no record". .									
11. Long-term Deferred Tuition: students can make the investment decision regarding the worth of an education with respect to future earning potential.									

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Postulated Innovation	IMPACT If Implemented: Great	Moderate	Slight	DESIRABILITY Of Implementing: Extr. Desir.	Extr. Undesir.	Other	FEASIBILITY Within next 30 years: High	Moderate	Low
12. Diverse Degree Tracks: more flexible arrangements, less strict credit requirements for degrees.									
13. Restructured Undergraduate Education: each student experiences a variety of educational environments, perhaps shorter degree programs with no major, students can move between disciplines; professional development relegated to graduate studies.									
14. New Educational Patterns: rather than advanced degrees, student takes two or more bachelor-level degrees--medical-legal degree, engineering-business, etc.									
15. "Distilled" Courses for Non-majors (not "introductory" courses): science and technology courses in liberal arts schools, social and behavioral courses in engineering schools, leading to more effective social direction for technology									
16. New Educational Time Scale: students learn throughout life, with interruptions, getting earned degrees at any time.									
17. Processes to "Retread": emphasis on correcting mature obsolescence rather than catering solely to immature individuals									
18. Acceptance of Universality of College Degree: college degree becomes like high school degree today--representation of time-in-grade, "equivalency tests"--and recognition that government must pay cost, as for high school education today.									
19. Student Community Concept: new, much different, form of dorm living									
20. Smaller Educational Units: widespread acceptance and use of educational units consisting of 600-1200 students									
21. Machine Tutors: individual students proceed at their own pace through responsive communication with computer terminal									
22. Multi-media Teaching Machines: utilizing more than simple auditory or visual senses . .									
23. Medically Aided Learning: chemicals, hypnosis, and other means of permitting rapid assimi-									

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Postulated Innovation	IMPACT If Implemented: Great	Moderate	Slight	DESIRABILITY Of Implementing: Extr. Desir.	Extr. Undesir.	Other	FEASIBILITY Within next 30 years: High	Moderate	Low
lation of factual material--for example, a textbook can be permanently assimilated in 30 minutes.									
24. Replacement of Lecture by Books: virtual extinction of lecture for transferring information, function fulfilled by books. . .									
25. TV Tape Cassettes: widespread use--tape libraries displacing book libraries, TV sets become readily available educational machines to be used at an individual's convenience.									
26. Smaller Classes: deemphasis on lecture format; smaller, more personal classrooms with professor leading discussions; emphasis on individual educational experience (e.g., participation in research, etc.). .									
27. New Communication Device: one that permits mass lecturing with sensations of touch, feel, smell and interaction now possible only in small classes.									
28. Communiversities: educational institutions which are located throughout, and interdependent with, the community of which they are a part.									
29. Electronic World University: world-wide communication network which would permit international classroom experience via two-way communication links.									
30. Dispersed Classrooms: with audio responses possible to audiovisual presentations . . .									
31. University without Walls: mass media education, particularly TV, enlarging the audience for university faculty.									
32. Professor's Role: changed from "teacher" to "facilitator of learning"									
33. Simplified Information Storage and Retrieval System: urgently needed, present process is too cumbersome.									

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TRENDS

Each of the following statements is descriptive of a trend perceived by one or more of the respondents and given a response in the first questionnaire. (Trends which appear inconsistent may be assumed to have been perceived by different respondents.)

In this questionnaire, you are requested to consider each statement and to give your estimate (1) of the importance of the perceived trend to the university (V=very important, M=moderately important, S=slightly important, U=unimportant) and (2) of the present strength of the trend (non-existent, slight, moderate, or strong).

Perceived Trend	Importance				Present Strength			
	V	M	S	U	Non-existent	Slight	Mod-erate	Strong
1. Continuation (and extension?) of war in Southeast Asia								
2. Increasingly mobile society								
3. Increasing amount of leisure time								
4. Increasing personal affluence								
5. Increasing popularity of population control and trend toward more liberal abortion laws. .								
6. Increasing rate of energy utilization								
7. Trend toward service economy, and thus an increasing number of people required in labor-intensive service industries								
8. Tightening job market for professionals, particularly Ph.D.'s, B.A.'s and M.A.'s								
9. Remote sensing (on large scale, as satellites, etc.; and on microscale, as in electron microscopy, spectrography, etc.) leading to less immediate contact with material, more automated data collection and analysis, etc. . . .								
10. Increased emphasis on educational technology and automated information handling services. .								

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Perceived Trend

	Importance				Present Strength			
	V	M	S	U	Non-existent	Slight	Moderate	Strong
11. Recognition of a long time constant for change in the universities--inevitable, will always be in conflict with rapid economic, social, and technological changes								
12. Increasing interest in education as a profit-making enterprise by the business sector of the economy								
13. Increasing divergence of objectives-- as viewed by the public and as viewed by the academic community								
14. Disillusionment with science and technology .								
15. Diffusion of experimental attitude and increasing readiness to support evolutionary change throughout social institutions								
16. Increasing emphasis on problem solving approach: "how to think" rather than "what to think"; "methods" rather than "facts"								
17. More widespread use of "synthesis"/"gestalt"/ "total systems" approach rather than piece-by-piece analysis; creating increased need for synthesizers and generalists rather than specialists								
18. Increasing concern with environment; emphasis on ecology and homeostatic (dynamic) equilibria rather than point (static) equilibria.								
19. Criticisms and challenges to traditional department structure and undergraduate education								
20. Increasing difficulty of taking action because of increasing use of "committee" approach to problem solving.								
21. More participatory organizations throughout society; increasing individual concern with policy and increasing organizational responsiveness to the demands for self-government .								
22. Increasing student involvement in academic decision-making								

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Perceived Trend

	Importance				Present Strength			
	V	M	S	U	Non-existent	Slight	Moderate	Strong
23. Increasing number of conduct codes for students and faculty								
24. Politicization of the university								
25. Rise in effective human intelligence								
26. Humanistic Renaissance; education to discover potential of man and not just for earning money								
27. Increasing opportunity for, and recognition of, informal learning (outside the classroom). . .								
28. Increasing recognition that college attendance is not essential to a successful life.								
29. Increasing number of enrollments and graduates, trend toward everyone having the opportunity for higher education								
30. Increasing need for continuing education and retraining because of rapid obsolescence of education and occupations								
31. Increasing diversity of needs of students and and increasing diversity of job demands--more courses, more precise descriptions of degrees								
32. Increasing specialization by educational institutions, leading to mutual institutional dependency								
33. Separation of research activities from the university; separation of scholarly activities from instructional activities								
34. Growth of, and increased emphasis on, community colleges								
35. Increasing cost of education--total cost and unit (per student) costs are increasing . . .								
36. Increasing state and federal involvement in university planning and operations through the increasing dependency of the university on public funds; distinction between private and public institutions becoming blurred.								
37. Apparent gap between federal funding trends and university needs--both in total amount and in distribution								

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COMMENTS:

APPENDIX D

Questionnaire 3

SUGGESTED PROCEDURE

WITHOUT DELAY:	1. Scan the entire questionnaire, including the description below. 2. Schedule a time to respond to the questionnaire; the time requirement is estimated to be _____ minutes for those sections checked with red pencil. (You do not have to respond to the entire questionnaire; unchecked portions are included for your information.) 3. Complete and return the enclosed card.
AT THE TIME YOU HAVE SCHEDULED:	1. Write in your responses to the questions. 2. Return the completed questionnaire in the enclosed envelope.

QUESTIONNAIRE 3

Study of University Futures

This is the longest of the series of four questionnaires. However, much of its length is made up of information on the results of the second questionnaire, and responses requested should not seem as demanding as those requested on the previous round.

The purposes of this questionnaire are 1) to investigate further what appear to be important aspects of the material you and the other respondents generated on the first and second questionnaires, 2) to identify areas of consensus or disagreement on this material. The section of "Student Attitudes" is expected to be omitted in the final questionnaire--this is the final round for that section.

Again, the following guidelines may be helpful:

1. Before beginning to answer the first section, scan the entire questionnaire. Before beginning a particular section, scan that section and read carefully the introduction to that section.
2. In responding to questions, do not take too long to make your decision. There will be an opportunity to revise your judgments in the next questionnaire (except for the section on "Student Attitudes"), and the "estimated time" given above may be used as a guide to the amount of time you should spend.
3. You are encouraged to respond to as many sections as you desire. You are asked specifically to respond to those sections marked with a red pencil.
4. You are encouraged to comment on any aspect of the study--context or approach; make comments on this questionnaire, or call me collect at (404) 873-4211, extension 5664, or in the late evening at (404) 261-0873.

ALTERNATIVE UNIVERSITY ROLES

The second questionnaire requested that you identify roles which appeared to be compatible with, or excluded by, the adoption of a given role. The table below summarizes the results in which there was general agreement.

Role	Compatible Roles	Excluded Roles	Role	Compatible Roles	Excluded Roles
1	2,9,21,22	4,18	13	5,8	-
2	1,3,22	4,10	14	6	-
3	-	6,7,10	15	2,6	-
4	12,14	1,10,23	16	14,15,22	-
5	20,23	-	17	2,10,22	-
6	13	-	18	3,5,11	10
7	9,22,24	3,4,18	19	1,2,15	-
8	3,5,6	4	20	5	4
9	1,2,7,21	4	21	1,7,9	4
10	-	4,14	22	1,2,3	-
11	-	10	23	-	-
12	3,4,13	10	24	4,6	-

In this questionnaire, you are requested to consider the list of roles (given again, below) from several standpoints. First, look over the list and pick the role which you believe the university did the most outstanding job of fulfilling during the decade 1960-1970. In the column labelled "60-70", assign this role a "10". Rate each of the other roles by comparing it to this role: assign a "5" if you believe the university fulfilled this role half as well as the most outstanding role, etc. (Decimals as well as whole numbers may be used, and different roles may be assigned the same rating.)

Next, consider the present strengths of the university--the capabilities of the university in fulfilling the suggested roles using existing capabilities, organizations, resources, etc. Identify the role which the university could most readily fulfill, and in the column labelled "71", assign this role a "10". Assign numbers to the other roles by comparing them to this "most readily fulfilled" role--a "5" would be assigned if the university appears to have the present capability to fulfill the role half as well, for example.

Finally, consider the desirability of the roles as primary roles for the university during the next four years. Identify the most desirable role for this period and assign it a "10" in the column labeled "71-75". Rate the other roles by comparing them with the most desirable role--a "5" would mean the role was half as desirable, etc. Repeat the same

procedure for the next two time periods: 1976-1985 (column labeled "76-85") and 1986-2000 (column labeled "86-00").

Role	60-70	71	71-75	76-85	86-00
1. Retrainer, upgrader of skills, continuing educator					
2. Professional manpower producer, educator of the professionals, educator of specialists					
3. Educator of leaders--intellectual leaders, most advanced sector of society; trainer of a leadership elite					
4. Educator of revolutionaries					
5. Educator for the liberal arts					
6. Mass educator--everyone is taught how to think, how to learn					
7. Mass educator--teacher of practical things: personal health, personal finance, craft skills					
8. Socializing agent--transmitter of culture to succeeding generations, preparation of the youth to live in an increasingly complex world					
9. Advisor, counselor, "tracker"--collect, advise, and steer students (of all ages) into training for vocations that offer them the greatest satisfaction; job placement					
10. Political force--enforcer of federal law, collector of information on individuals for law enforcement agencies, reactor and responder to government action on social issues, selective emphasis and distribution of information ("power broker") . . .					
11. Reference, authority, "unbiased" source of information					
12. Critic, evaluator--of status quo, of existing practices, of proposed developments					
13. Problem definer, societal advisor--articulator of social, individual or group needs					
14. Originator, stimulator of alternatives-alternatives to the status quo, specific suggested problem solutions					

Role	60-70	71	71-75	76-85	86-00
15. Executor of pilot projects--demonstration projects, which may originate within or outside universities . .					
16. Implementor of large-scale programs of social change--investment in community projects, executor of mission-oriented interdisciplinary programs					
17. Social servant--"on call"; resources available on demand, irrespective of type of request; community center, military/industrial servant, other public service					
18. Basic researcher--originator and evaluator of ideas and concepts (goal is increased understanding); generator of knowledge; research is only indirectly oriented toward perceived needs					
19. Applied researcher--developer of applications of existing knowledge; engineering development; research emphasis is a solution to defined problems and the application of existing technology to new opportunities					
20. Supporter of culture--locus of activity; supporter, particularly of the fine arts					
21. Social interface--buffer; a holding tank for matching bulges in population and trained manpower to job openings and manpower needs					
22. Employer--the provider of useful activity for trained educators, researchers, others					
23. Entertainer--extensions of past sub-professional sports (for example, football) into other areas; performer of the fine arts for the viewing public, etc.					
24. Operator of communications media--tv, radio, etc., can be operated for educational and other purposes					
25. (Added by a respondent on 2nd questionnaire) Innovator of new methods of problem solving--new associations and groups of people brought to problems					

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STUDENT ATTITUDES

On this questionnaire, you are asked to consider once more the factors that were suggested as important determinants of student attitudes. The factors are listed below, along with information about how the respondents to questionnaire 2 viewed the relative importance of each factor. In the column labeled "range", the lower and upper limits of the middle two quartiles (middle half) of the questionnaire 2 responses are given. The median response (the response for which half the responses were above and half were below) is given in the column labeled "median". If you responded to this section on questionnaire 2, your response is given in the third column.

Look over the entire list, and pick out the factor which you believe is the most important determinant of student attitudes. In the column labeled "Rel. Imp." (relative importance), assign this factor a "10". Rate each of the other factors by comparing it with this most important factor: assign a "5" to a factor which is half as important, etc. In the last column, indicate for each factor whether you believe (1) it will increase in importance over the next 4-5 years (indicate with a (+); (2) it will decrease in importance over the next 4-5 years (indicate with a "-"); (3) it will remain equally important over the next 4-5 years (indicate with a "0").

Factor	2nd Questionnaire Range	2nd Questionnaire Median	Your Res.	Rel. Imp.	Change
1. Intrinsic attitudes--as the student attempts to escape from parental restraints, prior disrespect for past accomplishments of society; underestimating problems of the future; lack of commitment to train himself to make improvements . .	4,6	5			
2. Atmosphere of self-determination--opportunity for independent thought, lack of value structure	5,9	7			
3. Clarity of goals and objectives--institutional and personal	5,8	7			
4. Change from parental permissiveness to institutional regidity--conduct codes for students, relationships with parents, carry over of controls over his social freedom from lower school and parents	1,8	4			
5. Selection process for entry into the university	2,5	2.5			
6. Disappearance of the common man's immortality--the possibility of making the world a better place to live in for one's grandchildren seems remote . . .	2,9	5			

Factor	2nd Questionnaire Range	Median	Your Res.	Rel. Imp.	Change
7. Disappearance of both physical and intellectual frontiers	0,5	3			
8. National policy--draft, Vietnam, foreign policy, domestic policies, perceived trend of increasing government control	8,9	9			
9. Nuclear warfare possibilities	5,7	5			
10. Attitude of national leaders to youth; pontification by members of the "establishment"	5,8	7			
11. Fashions in "intellectual snobishness"	3,5	4			
12. Perceptions of hypocrisy in others, especially adults	6,9.5	8			
13. Social concerns--perceived racism; race riots; enviornmental pollution; unemployment	8,8.5	8.5			
14. Perceived capability to effect reform--to change current political and social situations; failure to understand the fly wheel analogy: efforts to speed up fly wheel of society do count, but effort to make noticeable change is quite prodigious	6,9	8.5			
15. Personal concerns--relationship of one's self to society, lack of secure feeling about one's personal future	8,8.7	8			
16. Rapidity of social change; changes in value, changing from one era to another, "future shock" and rapid technological change	5,9	8			
17. Complex information environment--effectiveness of mass communication media, quick molding of attitude and opinion, lack of a filter which permits one to distinguish among information with different value and manipulated information, the exposure of failures to live up to advertised ideals	4,9	6			
18. The education and attitude of parents .	5,6	5			
19. The process of physiological development--different than in former times .	2,4	3			
20. Failure to comprehend competitive society--the pervasive determination of some individuals to impose their will over others	2,7	6			
21. Societal emphasis on the need for an education--college becomes something that is required	2,7.5	6			

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Factors	2nd Questionnaire Range	Median	Your Res.	Rel. Imp.	Change
22. Perceived insufficiency of appropriate roles for women who are college graduates	5,7.5	6			
23. Current attempts to make education relevant	6,9	7			
24. Discrepancy between high expectation and actual experiences of higher education	7,9.5	8			
25. Obsolete material--the idealization of history and the American dream in textbook is contradicted by experiences . .	7,8	8			
26. University location--urban or rural . .	1.5,5	3			
27. Commitment to excellence by the institution--especially top rank institutions	1,7	5			
28. Campus culture and tradition--reputation of student activism, students' perceptions of acceptable social behavior; need to rebel and the guilt generated by this need .	4,7	5			
29. University emphasis--liberal art or science and engineering; support of national causes(defense), institutional and individual roles in society (filling slots); roles perceived differently by student and by institution; lack of identity with the university as an institution	5,7.5	7			
30. Cross section of fellow students--social and racial composition of student body; lack of diversity	3,6	5			
31. Attitudes of fellow students--exaggerated contact with peer groups and restricted contact with other social groups; depression and apathy breeding depression and apathy; mass psychology; contagious nature of activism, perceived connections between past, present, and future students	7,9	7			
32. Relationships with faculty; teaching methodology--a faculty unaware of events outside the campus; the degree of faculty dedication to openess, searching, etc.; separation of faculty and administration from students' problems; faculty composition (perceived on occasion as being misfits from the outside world)	6,7.5	6			

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Factors	2nd Questionnaire Range	Median	Your Res.	Rel. Imp.	Change
33. University inflexibility--impersonality of institutional structure; rigidity of policies and procedures; bureaucratization; lack of opportunity to actively and meaningfully take part in university government	7,8	8			
34. Rigid curriculum requirements--coupled with grading, degree requirements; antiquated curriculum vs student's needs; lock-step educational processes for what is essentially an individual learning process	8,8	8			
35. Present curriculum--within disciplines, not matched to real perceived problems; more demand for "education" and less demand for "training"	5,8.8	8			
36. Need for external objectives--opportunities for service such as peace Corps, Vista, involvement in urban and environmental problems; preoccupation with ideas and beliefs and little outlet for social action; need for experiences to recognize the "why" of a course	5,8	6			
37. Increased personal affluence	3,5	5			

COMMENTS:

EFFECTS OF EDUCATION

Recall that this section considers the process of higher education as a series of experiences occurring to the student, with subsequent changes in the students. Assuming one were to evaluate the higher education process by taking into account characteristics of the student which may or may not change, this section is concerned with the identification and relative importance of these characteristics. The responses to the first questionnaire suggested several characteristics, and the second questionnaire requested that you rate the characteristics according to their importance and identify any that appeared to be related.

The characteristics are listed below. Based on the results of the second questionnaire, some of the characteristics have been combined in the list below. Beside each characteristic, the column labeled "range" gives the lower and upper limits of the mid-quartiles (the middle half of the responses). The column labeled "median" gives the median response (the response for which half the responses were above and half were below) for each characteristic on the second questionnaire. Your response on the second questionnaire is given in the column labeled "Your Res.".

In this questionnaire, you are requested to rate the importance of each characteristic or group of characteristics in each of three time periods: 1971-75 (the next four years), 1976-85, and 1986-2000. Scan the list, pick the characteristic or group of characteristics you believe to be the most important for the first time period, and assign this characteristic or group a "10" in the column labeled 71-75. Rate each of the other characteristics or group by comparing it with this most important characteristic--assign a "5" if it is half as important, etc. (Some groups of characteristics may have negative aspects. Assume that both positive and negative aspects would be taken into account in measuring changes in the student, and assign a weight to the characteristic or group according to its absolute relative importance.) Repeat this process for the other two time periods.

Follow the same process in responding to the section on graduate characteristics.

UNDERGRADUATE CHARACTERISTICS

Characteristic	2nd Questionnaire			71-75	76-85	86-00
	Range	Median	Your Res.			
1. Communication skills (both verbal and written); competence of personal interaction	6,8	7				
2. Attitude toward other persons; tolerance, understanding, and respect for different attitudes, values, and beliefs; self-respect	7,9	8				
3. Ability to generalize; ability to visualize interrelationships (particularly among disciplines); ability to foresee results of actions; perceptiveness and ability to think about complex topics	7,10	8				
4. Ability to work in any situation . . .	3,7	5				

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Characteristic	2nd Questionnaire Range	Median	Your Res.	71-75	76-85	86-00
5. Sensitivity to aesthetic qualities . . .	5,6,5	6				
General accumulation of knowledge; an awareness of the complexities and range of phenomena	5,8	7				
Knowledge of liberal arts	4,6	4				
6. Social maturity; ability to relate to society; revolutionary perspective; a sense of time and history	7,8	8				
A sense of reality; self-awareness, awareness of stress and limits, awareness of own ability and interests; ability to relate self, society, and culture . . .	7,9.5	8				
Individual maturity	7,8	8				
Awareness of, and interest in, problems facing humanity	7,8	8				
7. Ability to bear responsibility, to assume and use authority, to comprehend and use power	5,9	6				
Acceptance of responsibility for individual action and social consequence . . .	4,9	6				
Dependence, individualism; capability for self-definition and motivation . . .	6.5,9	8				
Set of values based on reason; commitment to objectivity, rational opinion, and a questioning attitude; understanding of the relationship between information and quality of judgment	8,9	8				
Ability to set goals and attain them, to discipline one's thinking	4,9	6				
8. Social habits; behavior related to personal health and environment	4,6	5				
Degree of socialization, degree to which the student accepts the values of society	1,8	3.5				
9. Ability to understand how new knowledge is developed	4,7.5	5				
Ability to utilize existing knowledge .	6,7	6				
Analytic skills, ability to approach problems logically, objectively, and persistently; capability for problem analysis and solution; ability to organize intellectual material; ability to think critically, to make judgments on issues, to select the best or worst from alternatives and to seek new alternatives	6,10	7.5				

(Place rating for this group on next page)

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Characteristic	2nd Questionnaire Range	Median	Your Res.	71-75	76-85	86-00
Intellectual maturity	7,10	8				
10. Breadth and scope of interests; interests in and ability to engage in activities beyond one's job	6,9	7				
11. Skills in abstraction and symbolism; ability to solve original mathematical problems	3,5	4				
12. 9 Ability to generalize; ability to visualize interrelationships (particularly among disciplines); ability to foresee results of actions; perceptiveness and ability to think about complex topics	7,10	8				
13. Bureaucratic sophistication, ability to work in and around large organizations	3,7	5				
14. Alienation (from parents and society); disillusionment	0,8	2				
15. Specific skills in a major area (within a discipline	3.5,7	5				
Research skills; capability of doing graduate work	1,5	5				
16. Response to authority, capability to do an assignment neatly and on time without questioning the reasoning behind assignment	0,2	1				
17. Creative capability	5.5,8	7				
18. Respect for, identification and excitement with, learning process and continued learning; motivation to learn	6,9	8				
~~Research skills; capability of doing graduate work~~	6.5,9	8				
Capacity for further learning; ability to undertake life-long learning program; time required to gain new skills						

COMMENTS:

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GRADUATE CHARACTERISTICS

Characteristic	2nd Questionnaire Range	Median	Your Res.	71-75	76-85	86-00
1. Technical competence, skills and knowledge, in a chosen academic field; professional or advanced skills; narrow specialization	7,9	8				
Research skills and ability; ability to build existing knowledge to develop further knowledge; ability to use knowledge to select fruitful areas for research	6,8	8				
2. Capability to make decisions; ability to seek alternative problem solutions; capability to distinguish between carefully reasoned or researched conclusions and meaningless verbiage	5,8	7.5				
Independence of thinking, individuality, independence; dependence; capability to discipline one's own thinking, to carry out independent investigations, to work in area of speciality without control	8.5,10	9				
3. Persistence, ability to accomplish sustained intellectual work, to work hard for long periods of time; mechanization; capability to do disciplined, long-termed creativity; renewal capability, a capacity for reassessing one's intellectual position and making necessary adjustments based on empirical observation; creativity	6,8	6.5				
4. Synthesizing capabilities; ability to establish relationships, to generalize .	6,8.5	8				
5. Scope of interests; broad professional interests; general accumulation of knowledge	5,7.5	7				
Ability to work with others, especially in interdisciplinary groups; ability to accept and carry out responsibility, to use power and authority; leadership ability	4,7	7				
6. Teaching ability; ability to interact with students, to do creative teaching .	4,8	6				
Ability to communicate in writing and verbally; ability to communicate expertise to others who are not experts . .	5,7	7				

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Characteristic	2nd Questionnaire Range	Median	Your Res.	71-75	76-85	86-00
7. Self-assurance, self-confidence; elitism, feeling of confidence that one knows it all	2,4	2				
8. Internalization of scientific method; identification and excitement with learning process; acceptance of the idea that scholarly aims are quite acceptable goals; commitment to a generally inquiring or research posture	4.5,7	7				
9. Specific professional ideals	3,6	3				
10. Degree of socialization, degree to which the student accepts the values of society	0,4	3				
11. Attitude toward other persons and toward society; social conscience; awareness of, and interest in, problems facing humanity; ability to relate self, society, culture, and an awareness of responsibility	5,8	7				
12. Apathy	0,2	1				
13. Sense of reality; degree of sophistication; degree of naivety	2,7	5				
14. Maturity; social and individual maturity	2,8	7				
15. Sensitivity to aesthetic qualities . . .	4,6	5				
16. Idealism	0,5	4				

COMMENTS:

INNOVATIONS

The second questionnaire requested that you evaluate each of the postulated innovations on the basis of 1) their impact on the university if they were implemented, 2) the desirability of their being implemented, and 3) the overall feasibility (political and technical) of their being implemented within the next thirty years. Most of the innovations were viewed as having a great or moderate impact if implemented, but for some of the innovations there was disagreement as to their desirability and feasibility of implementation.

This questionnaire lists the innovations below and requests you to consider them once again. First, in the column labeled "self rating", rate your own level of knowledge, experience, and competence in the area of each of the postulated innovations: use a "4" if you have extensive experience and knowledge in the area, a "3" if you have a good reading knowledge or some experience, a "2" if you have some knowledge of the area, and a "1" if you have little knowledge or experience pertinent to the area.

The next column, labeled "med. feas." gives for each innovation the middle response from the second questionnaire. If the respondents were almost equally divided as to high, moderate, or low feasibility on an innovation, this is indicated by "NA" (no agreement).

The next two columns are for your response on this questionnaire. Assume, for each of the innovations, that it will be implemented--the event "will occur"; "over half the schools adopt the innovation", etc. Making this assumption, what is the date (year) by which there is a 50% chance of it being implemented? Write your estimate in the column labeled "50%". Similarly, estimate the date by which there is a 90% chance (probability of .9) that the innovation will be implemented, and place this year in the column labeled "90%".

Finally, consider once again those innovations marked with an asterisk. (There was little agreement as to the desirability of implementing these innovations.) In the space provided, list what you believe will be likely consequences (both desirable and undesirable) if the given innovation is implemented.

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Innovation	Self Rating	Med. Feas.	50%	90%
1. New Language: development which, with portable machines, would permit anyone to speak in any language and receive a printed text readable by all; one written symbol language for any spoken input language		Low		
1. 30-Hour Work Week		High		
3. Mass Computer Utilities: computer terminals in homes will be as common as telephones are today.		NA		
4. Re-emergence of presidential leadership: strong leadership in setting goals and defining objectives; wider discretionary power		Mod		
*5. University Reorganization: the elimination of the autonomy of individual departments		Mod		
6. Application of "Planning-Programming-Budgeting System" to Universities: more critical definitions of costs, benefits; applications of systems concepts and computer-based information systems to support decision-making, administration, and management of the university . . .		Mod/Hi		
7. Participatory Decision-Making: new forms of organization that will permit the legitimation of interaction between those holding diverse views		Mod		
*8. New Organizational Structure: increased control by faculty and students, less by administration; incentives for university government to be more responsive to "consumers" of education		Mod		
9. Doctoral Program with Emphasis on Teaching: professors would have the function of instructing rather than research and publishing		NA		
*10. Elimination of Grading System: perhaps replaced by system of "pass/no record"		Mod		
*11. Long-term Deferred Tuition: students can make the investment decision regarding the worth of an education with respect to future earning potential . . (Note: responses to 2nd questionnaire were not in agreement as to impact of this innovation)		High		

Innovation	Self Rating	Med. Feas.	50%	90%
12. Diverse Degree Tracks: more flexible arrangements, less strict credit requirements for degrees		High		
13. Restructured Undergraduate Education: each student experiences a variety of educational environments, perhaps shorter degree programs with no major, students can move between disciplines; professional development regulated to graduate studies		Mod		
14. New Educational Patterns: rather than advanced degrees, student takes two or more bachelor-level degrees--medical-legal degree, engineering-business, etc.		Mod		
15. "Distilled" Courses for Non-majors (not "introductory" courses): science and technology courses in liberal arts schools, social and behavioral courses in engineering schools, leading to more effective social direction for technology		Mod		
16. New Educational Time Scale: students learn throughout life, with interruptions, getting earned degrees at any time		High		
17. Processes to "Retread": emphasis on correcting mature obsolescence rather than catering solely to immature individuals		High		
*18. Acceptance of Universality of College Degree: college degree becomes like high school degree today--representation of time-in-grade, "equivalency tests"--and recognition that government must pay cost, as for high school education today		Mod		
19. Student Community Concept: new, much different, form of dorm living . . .		Mod		
20. Smaller Educational Units: widespread acceptance and use of educational units consisting of 600-1200 students		Mod		
*21. Machine Tutors: individual students proceed at their own pace through responsive communication with computer terminal		High		
22. Multi-media Teaching Machines: utilizing more than simple auditory or visual senses		Mod		

Innovation	Rating	Med. Feas.	50%	90%
*23. Medically Aided Learning: chemicals, hypnosis, and other means of permitting rapid assimilation of factual material--for example, a textbook can be permanently assimilated in 30 minutes		Mod/Low		
*24. Replacement of Lecture by Books: virtual extinction of lecture for transferring information, function fulfilled by books		Low		
25. TV Tape Cassettes: widespread use--tape libraries displacing book libraries, TV sets become readily available educational machines to be used at an individual's convenience		High		
26. Smaller Classes: deemphasis on lecture format; smaller, more personal classrooms with professor leading discussions; emphasis on individual educational experience (e.g., participation in research, etc.)		Mod		
27. New Communication Device: one that permits mass lecturing with sensations of touch, feel, smell and interaction now possible only in small classes . .		Mod		
*28. Communiversities: educational institutions which are located throughout, and interdependent with, the community of which they are a part		Mod		
29. Electronic World University: world-wide communication network which would permit international classroom experience via two-way communication links . . .		NA		
30. Dispersed Classrooms: with audio responses possible to audiovisual presentations		High		
31. University without Walls: mass media education, particularly TV, enlarging the audience for university faculty .		High		
32. Professor's Role: changed from "teacher" to "facilitator of learning"		Mod		
33. Simplified Information Storage and Retrieval System: urgently needed, present process is too cumbersome . .		Mod		

* List likely consequences of these innovations on the next page

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Innovation	Likely Consequences
5. Autonomy of individual departments eliminated	
8. Increased control by faculty and students	
10. Grading system eliminated	
11. Long-term deferred tuition	
18. College degree becomes like high school degree; equivalency tests .	
21. Machine tutors	
23. Medically aided learning	
24. Books replace lectures	
28. Communiversities	

TRENDS

The second questionnaire requested that you rate the perceived trends on the basis of their importance to the development of the university and on the basis of their present strength. Only those trends which were viewed as being most important to the university have been included on this questionnaire. (A trend was included if either the median response was "very important", or 80% of the respondents rated the trend as "very important" or "moderately important".) Also included are data on how the "present strengths" of these trends were viewed: the mid-quartiles range (the "middle half" of the responses--one-quarter of the responses were above, one-quarter below, this range) and the median response (response for which 50% were above, 50% below).

On this questionnaire, you are requested to reconsider your estimate of the present strength of each trend and revise it if you desire.

Next, consider how you expect each trend to behave over the three time periods given: 1972-75, 1976-85, 1986-2000. Rate each trend either as continuing unchanged, as increasing, as strongly increasing, or as decreasing (reversal) from the present strength. (Please use the notations given.)

Abbreviations Used

Present Strength:	For Future Behavior:
"N" = Non-existant	(use) "D" for decreasing (reversal)
"Sl" = Slight	"U" for unchanging
"M" = Moderate	"I" for increasing
"S" = Strong	"SI" for strongly increasing

Trend	Perceived Strength 2nd Questionnaire Range/Median	Your Res.	Present Strength N	S1	M	S	Future Behavior 72-75	76-85	86-00
1. Continuation of war in Southeast Asia	S1-S/M								
2. Trend toward service economy, and thus an increasing number of people required in labor-intensive service industries	M-S/M								
3. Tightening job market for professionals . . .	M-S/S								
4. Increased emphasis on educational technology and automated information handling services	S1-M/M								
5. Increasing divergence of objectives--as viewed by the public and as viewed by the academic community	S1-S/M								
6. Disillusionment with science and technology .	S1-S/M								
7. Diffusion of experimental attitude and increasing readiness to support evolutionary change throughout social institutions	S1-M/S1								
8. Increasing emphasis on problem solving approach: "how to think" rather than "what to think"; "methods" rather than "facts" . .	S1-M/S1								
9. More widespread use of "synthesis"/"gestalt"/ "total systems" approach rather than piece-by-piece analysis; creating increased need for synthesizers and generalists rather than specialists	S1-M/S1								
10. Increasing concern with environment; emphasis on ecology and homeostatic (dynamic) equilibria rather than point (static) equilibria .	M-S/S								
11. Criticisms and challenges to traditional department structure and undergraduate education	M-S/M								
12. More participatory organizations throughout society; increasing individual concern with policy and increasing organizational responsiveness to the demands for self-government .	N-M/S1								
13. Increasing student involvement in academic decision-making	S1-S/M								
14. Politicization of the university	S1-S/M								

Trend	Perceived Strength 2nd Questionnaire Range/Median	Your Res.	Present Strength N	S1	M	S	Future Behavior 72-75	76-85	86-00
15. Rise in effective human intelligence	N-S1/S1								
16. Humanistic Renaissance; education to discover potential of man and not just for earning money	S1-M/S1								
17. Increasing opportunity for, and recognition of, informal learning (outside the classroom)	S1-M/S1								
18. Increasing recognition that college attendance is not essential to a successful life	S1-M/M								
19. Increasing number of enrollments and graduates, trend toward everyone having the opportunity for higher education	M-M/M								
20. Increasing need for continuing education and retraining because of rapid obsolescence of education and occupations	S1-M/M								
21. Separation of research activities from the university; separation of scholarly activities from instructional activities . .	N-S1/S1								
22. Growth of, and increased emphasis on, community colleges	M-S/S								
23. Increasing cost of education--total cost and unit (per student) costs are increasing	S-S/S								
24. Increasing state and federal involvement in university planning and operations through the increasing dependency of the university on public funds; distinction between private and public institutions becoming blurred . .	M-S/S								
25. Apparent gap between federal funding trends and university needs--both in total amount and in distribution	M-S/M								

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COMMENTS :

APPENDIX E

Questionnaire 4

SUGGESTED PROCEDURE

WITHOUT DELAY:

1. Scan the entire questionnaire, including the description below.
2. Schedule a time to respond to the questionnaire; the time requirement is estimated to be _____ minutes for those sections checked with red pencil. (You do not have to respond to the entire questionnaire; unchecked portions are included for your information.)
3. Complete and return the enclosed card.

AT THE TIME YOU HAVE SCHEDULED:

1. Write in your responses to the questions.
2. Return the completed questionnaire in the enclosed envelope.

QUESTIONNAIRE 4
(Final)

Study of University Futures

This is the last in the series of questionnaires. The section on "student attitudes" has been deleted, as has the "graduate characteristics" portion of the section on "Effects of Education".

The purposes of this questionnaire are (1) to further refine the judgments made on previous questionnaires and (2) to investigate the possible consequences of some of the trends and innovations which were suggested on the first questionnaire and rated on subsequent rounds.

Again, the following guidelines may be helpful:

1. Before beginning to answer the first section, scan the entire questionnaire. Before beginning a particular section, read carefully the introduction to that section.

2. You are encouraged to respond to as many sections as you desire. You are asked specifically to respond to those sections marked with a red pencil.

3. Comments on any aspect of the study are welcomed, and you are requested to spend a few minutes giving your reactions to the study on the last page. If you have any questions, or if you prefer to make your comments verbally, call me collect at (404) 873-4211, extension 5664, or in the late evening at (404) 261-0873.

Many thanks--your continuing participation has been appreciated.

ALTERNATIVE UNIVERSITY ROLES

The third questionnaire requested that you consider the list of alternative roles which the university might adopt from several standpoints: the relative performance of the university during the 1960's in fulfilling each role; how well each role could be fulfilled with the existing capabilities, resources, organization, etc., of the university; and the relative desirability of each role for the university during 1971-75, 1976-85, 1986-2000. As one respondent pointed out, you were requested to make three different judgments: (1) what the university has done; (2) what the university could do; and (3) what the university should do.

The results of the third questionnaire are given below. For each role, the mid-quartiles range (middle half) of the responses are shown for each time period by a triangular shaded area. The left-most vertex of the triangle points to the value of the median (middle) response, and the other vertices correspond to the upper and lower values of the middle half of the responses. If you responded to this section, your response is shown just above or below the shaded area.

For this questionnaire, you are requested again to consider each time period separately and to choose the major role which the university did (1960-70), could do (1971), and should do (1971-75, 1976-85, and 1986-2000). (The role may be different for each different time period.) Assign a "10" to this role. For each time period, rate each of the other roles by comparing it to the role which was assigned a "10" for that period, and place the (new) weightings in the space labelled "new wts."

Role		"Did" 60-70	"Could" 71	"Should" 71-75	"Should" 76-85	"Should" 86-00
1. Retrainer, upgrader of skills, continuing educator		10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-
	New Wts.					
2. Professional manpower producer, educator of the professionals, educator of specialists		10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-
	New Wts.					

Alternative University Roles

Role	"Did" 60-70	"Could" 71	"Should" 71-75	"Should" 76-85	"Should" 86-00
3. Educator of leaders--intellectual leaders, most advanced sector of society; trainer of leadership	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-
New Wts.	____	____	____	____	____
4. Educator of revolutionaries	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-
New Wts.	____	____	____	____	____
5. Educator for the liberal arts	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-
New Wts.	____	____	____	____	____
6. Mass educator--teacher of practical things: personal health, personal finance, craft skills	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-
New Wts.	____	____	____	____	____
7. Mass educator--everyone is taught how to think, how to learn	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-
New Wts.	____	____	____	____	____

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Alternative University Roles

Role	"Did" 60-70	"Could" 71	"Should" 71-75	"Should" 76-85	"Should" 86-00
8. Socializing agent--transmitter of culture to succeeding generations, preparation of the youth to live in an increasingly complex world	10- 8- 6-◀ 4- 2- 0-	10- 8- 6-◀ 4- 2- 0-	10- 8-◀ 6-◀ 4- 2- 0-	10- 8-◀ 6-◀ 4- 2- 0-	10- 8-◀ 6-◀ 4- 2- 0-
New Wts.	____	____	____	____	____
9. Advisor, counselor, "tracker"--select, advise, and steer students (of all ages) into training for vocations that offer them the greatest satisfaction; job placement	10 8- 6- 4-◀ 2- 0-	10- 8- 6-◀ 4- 2- 0-	10- 8- 6-◀ 4- 2- 0-	10- 8- 6-◀ 4- 2- 0-	10- 8- 6-◀ 4- 2- 0-
New Wts.	____	____	____	____	____
10. Political force--enforcer of federal law, collector of information on individuals for law enforcement agencies, reactor and responder to government action on social issues, selective emphasis and distribution of information ("power broker")	10- 8- 6- 4- 2-◀ 0-	10- 8- 6- 4- 2-◀ 0-	10- 8- 6- 4- 2-◀ 0-	10- 8- 6- 4- 2-◀ 0-	10- 8- 6- 4- 2-◀ 0-
New Wts.	____	____	____	____	____
11. Reference, authority, "unbiased" source of information	10- 8- 6-◀ 4- 2- 0-	10- 8- 6-◀ 4- 2- 0-	10- 8-◀ 6-◀ 4- 2- 0-	10- 8-◀ 6-◀ 4- 2- 0-	10- 8-◀ 6-◀ 4- 2- 0-
New Wts.	____	____	____	____	____
12. Critic, evaluator--of status quo, of existing practices, of proposed developments	10- 8- 6- 4-◀ 2- 0-	10- 8- 6-◀ 4- 2- 0-	10- 8-◀ 6-◀ 4- 2- 0-	10- 8-◀ 6- 4- 2- 0-	10- 8-◀ 6- 4- 2- 0-
New Wts.	____	____	____	____	____

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Alternative University Roles

Role	"Did" 60-70	"Could" 71	"Should" 71-75	"Should" 76-85	"Should" 86-00
13. Problem definer, societal advisor--articulator of social, individual or group needs	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-
New Wts.	____	____	____	____	____
14. Originator, stimulator of alternatives--alternatives to the status quo, specific suggested problem solutions	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-
New Wts.	____	____	____	____	____
15. Executor of pilot projects--demonstration projects, which may originate within or outside universities	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-
New Wts.	____	____	____	____	____
16. Implementor of large-scale programs of social change--investment in community projects, executor of mission-oriented interdisciplinary programs	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-
New Wts.	____	____	____	____	____
17. Social servant--"on call"; resources available on demand, irrespective of type of request; community center, military/industrial servant, other public service	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-
New Wts.	____	____	____	____	____

6

Alternative University Roles

Role	"Did" 60-70	"Could" 71	"Should" 71-75	"Should" 76-85	"Should" 86-00
18. Basic researcher--originator and evaluator of ideas and concepts (goal is increased understanding); generator of knowledge; research is only indirectly oriented toward perceived needs	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-
New Wts.	____	____	____	____	____
19. Applied researcher--developer of applications of existing knowledge; engineering development; research emphasis is a solution to defined problems and the application of existing technology to new opportunities	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-
New Wts.	____	____	____	____	____
20. Supporter of culture--locus of activity; supporter, particularly of the fine arts	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-
New Wts.	____	____	____	____	____
21. Social interface--buffer; a holding tank for matching bulges in population and trained manpower to job openings and manpower needs	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-
New Wts.	____	____	____	____	____
22. Employer--the provider of useful activity for trained educators, researchers, others	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-	10- 8- 6- 4- 2- 0-
New Wts.	____	____	____	____	____

7

Alternative University Roles

Role		"Did" 60-70	"Could" 71	"Should" 71-75	"Should" 76-85	"Should" 86-00
23. Entertainer--extensions of past subprofessional sports (for example, football) into other areas; performer of the fine arts for the viewing public, etc.		10- 8- 6-◀ 4- 2- 0-	10- 8- 6-◀ 4- 2- 0-	10- 8- 6- 4-◀ 2- 0-	10- 8- 6- 4-◀ 2- 0-	10- 8- 6- 4-◀ 2- 0-
	New Wts.	____	____	____	____	____
24. Operator of communications media--tv, radio, etc., can be operated for educational and other purposes		10- 8- 6- 4- 2-◀ 0-	10- 8- 6- 4-◀ 2- 0-	10- 8- 6- 4-◀ 2- 0-	10- 8- 6-◀ 4- 2- 0-	10- 8- 6-◀ 4- 2- 0-
	New Wts.	____	____	____	____	____
25. (Added by a respondent on 2nd questionnaire) Innovator of new methods of problem-solving--new associations and groups of people brought to problems		10- 8- 6- 4-◀ 2- 0-	10- 8- 6- 4-◀ 2- 0-	10- 8- 6-◀ 4- 2- 0-	10- 8- 6-◀ 4- 2- 0-	10- 8- 6-◀ 4- 2- 0-
	New Wts.	____	____	____	____	____

COMMENTS:

8

EFFECTS OF EDUCATION
(Undergraduate)

Recall that this section is concerned with characteristics of a student which may or may not change as a result of his educational experience. You have been asked to imagine an evaluation of the educational process which would take into account such characteristics. The third questionnaire requested that you rate, for three different time periods, the characteristics according to their relative importance. The results of the last questionnaire are summarized below. Beside each characteristic, or group of characteristics, the approximate mid quartiles range of responses and the median response are indicated for each of the three time periods by a shaded triangle. The leftmost vertex of the triangle points to the value of the median response and the other vertices indicate the range of values which contains approximately 50% of the responses. If you responded to this section on the last questionnaire, your response is shown to the right of each scale.

On this questionnaire, you are requested to consider each item once again and give your final weightings in the spaces provided. For the first time period, assign a "10" to the item that you believe is most important for 1971-75. Rate each of the other items by comparing it with this "most important" item, and repeat the process for each of the other time periods.

The order of the items should not be considered important.

Undergraduate Characteristics

Characteristic	1971-75	1976-85	1986-00
1. Ability to understand how new knowledge is developed; ability to utilize existing knowledge; analytic akills, ability to approach problems logically, objectively, and persistently; capability for problem analysis and solution; ability to organize intellectual material; ability to think critically, to make judgments on issues, to select the best or worst from alternatives and to seek new alternatives; intellectual maturity	10- 8-◢ 6- 4- 2- 0- New Weights_____	10- 8-▬ 6- 4- 2- 0- _____	10- 8-◢ 6- 4- 2- 0- _____
2. Attitude toward other persons; tolerance, understanding, and respect for different attitudes, values, and beliefs; self-respect	10- 8-◢ 6- 4- 2- 0- New Weights_____	10- 8-◥ 6- 4- 2- 0- _____	10- 8-◥ 6- 4- 2- 0- _____

Undergraduate Characteristics

	1971-75	1976-85	1986-00
3. Creative capability	10- 8-◀ 6- 4- 2- 0-	10- 8-— 6- 4- 2- 0-	10- 8-◀ 6- 4- 2- 0-
	New Weights_____	_____	_____
4. Breadth and scope of interests; interests in and ability to engage in activities beyond one's job	10- 8-◀ 6- 4- 2- 0-	10- 8-◀ 6- 4- 2- 0-	10- 8-◀ 6- 4- 2- 0-
	New Weights_____	_____	_____
5. Response to authority, capability to do an assignment neatly and on time without questioning the reasoning behind assignment	10- 8- 6- 4- 2-◀ 0-	10- 8- 6- 4- 2-◀ 0-	10- 8- 6- 4- 2-◀ 0-
	New Weights_____	_____	_____
6. Respect for, identification and excitement with, learning process and continued learning; motivation to learn; capacity for further learning; ability to undertake life-long learning programs; time required to gain new skills	10- 8-◀ 6- 4- 2- 0-	10- 8-◀ 6- 4- 2- 0-	10- 8-◀ 6- 4- 2- 0-
	New Weights_____	_____	_____
7. Ability to generalize; ability to visualize interrelationships (particularly among disciplines); ability to foresee results of actions; perceptiveness and ability to think about complex topics	10- 8-◀ 6- 4- 2- 0-	10- 8-◀ 6- 4- 2- 0-	10- 8-◀ 6- 4- 2- 0-
	New Weights _____	_____	_____

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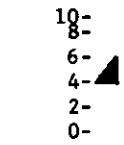
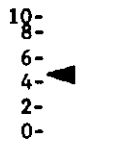
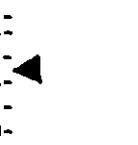
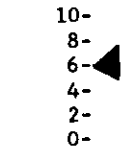
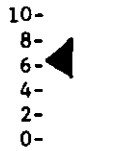
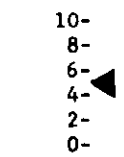
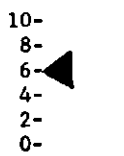
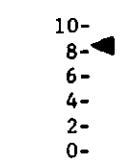
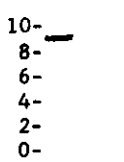
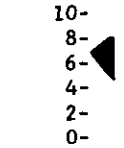
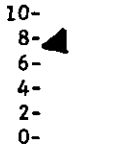
Undergraduate Characteristics

	1971-75	1976-85	1986-00
8. Skills in abstraction and symbolism; ability to solve original mathematical problems			
	New Weights _____	_____	_____
9. Ability to work in any situation			
	New Weights _____	_____	_____
10. Specific skills in a major area (within a discipline); research skills; capability of doing graduate work			
	New Weights _____	_____	_____
11. Social maturity; ability to relate to society; revolutionary perspective; a sense of time and history; a sense of reality; self-awareness, awareness of stress and limits, awareness of own ability and interests; ability to relate self, society, and culture; individual maturity; awareness of, and interest in, problems facing humanity			
	New Weights _____	_____	_____
12. Sensitivity to aesthetic qualities; general accumulation of knowledge; an awareness of the complexities and range of phenomena; knowledge of liberal arts			
	New Weights _____	_____	_____

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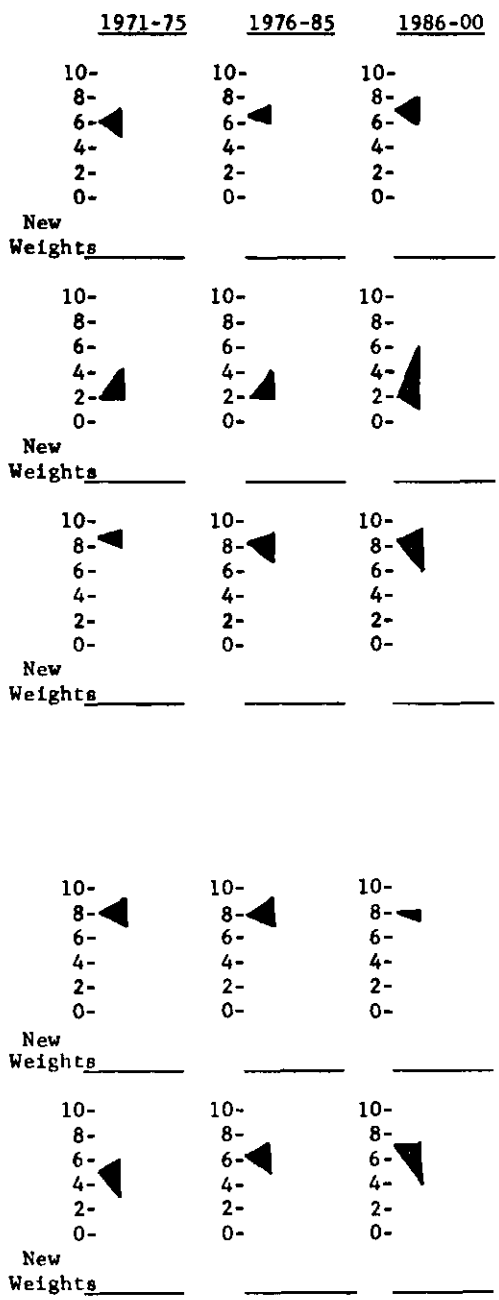
Undergraduate Characteristics



12

INNOVATIONS

The third questionnaire requested that you estimate the dates by which there were a 50% and 90% chance of the innovations occurring or being implemented. In addition, you were requested to assume that certain events would occur and to list the likely consequences of these events. With few exceptions, the estimates of dates were not too dispersed, and the question as to "likely consequences" produced many possibilities.

On this questionnaire, you are requested to consider the likelihood and effect of some of the possible consequences suggested by responses on the third questionnaire. For each event, give your estimate as to the likelihood that it will (ever) occur.

Next, assume that the event does occur, and consider each result that was suggested as a possible consequence. Give your estimate of (1) the likelihood that this result will be a consequence of the event, and (2) the effect of the consequence.

Use the following notation:

Likelihood		Effect	
Use	for	Use	for
1	Almost impossible	-2	Very detrimental
2	Possible	-1	Detrimental
3	Probable	0	Little or no effect
4	Virtually certain	+1	Favorable
		+2	Very favorable

Event	Likelihood	Effect
1. University Reorganization: the elimination of the autonomy of individual departments (Previous Median Estimate of Feasibility: Moderate)	_____	NA
Assuming the above event occurs, it might result in:		
A. Broader, less specialized education . . .	_____	_____
B. More programmatic, less capricious, decision-making within the university	_____	_____
C. More flexible educational programs; new curricula (including problem-solving focus)	_____	_____
D. Union control of faculty	_____	_____
E. Legislative and Board control of University	_____	_____
F. Preservation of (deemphasized) departments for administrative and academic home base	_____	_____

Event	Likelihood	Effect
G. Increased bureaucracy	_____	_____
H. Increased emphasis on teaching, less on research	_____	_____
I. Increased emphasis on "problem-focused" research and real problems of society . .	_____	_____
2. New Organizational Structure: increased control by faculty and students, less by administration; incentives for university government to be more responsive to "consumers" of education (Previous Estimate of Feasibility: Moderate)	_____	NA
Assuming the above event occurs, the following events might occur:		
A. Decreased bureaucracy	_____	_____
B. University governance becoming a part of the learning and educational process . .	_____	_____
C. A decrease in funding from outside the university, with the student and his family contributing a larger portion of the cost of education	_____	_____
D. Less rigid degree requirements	_____	_____
E. Increased number of erroneous decisions because of naivete, lack of breadth, and a premium on presentation and personality	_____	_____
F. Change in university atmosphere, leading to a less competitive, more intellectual and more individualized climate	_____	_____
G. Decision-making process would "bog down" because of decreasing interest	_____	_____
H. Lower faculty salaries	_____	_____
I. Increased experimentation and the following of fads	_____	_____
3. Elimination of Grading System: perhaps replaced by system of "pass/no record" (Previous Estimate of Feasibility: Moderate)	_____	NA
Assuming the above event occurs, the following events might occur:		
A. Reduced competition; reduced incentives and motivation for some students	_____	_____

Event		Likelihood	Effect
	B. Evaluation of the significance of the educational experience will be by some yet-to-be-devised measure(s)	_____	_____
	C. Lower educational standards	_____	_____
	D. Tendency for job selection to be based on who rather than what the applicant knows	_____	_____
	E. Forced egalitarianism	_____	_____
	F. Acceptance of mediocrity; graduates who are incompetent	_____	_____
	G. Decreased efforts by faculty to help students learn	_____	_____
	H. More creative graduates who are eager to learn more	_____	_____
4.	Long-term Deferred Tuition: students can make the investment decision regarding the worth of an education with respect to future earning potential (Previous Estimate of Feasibility: High)	_____	NA
	Assuming the above event occurs, the following events might occur:		
	A. A decrease in the percentage of students who choose to attend college	_____	_____
	B. Forgiveness programs, based on performance after graduation	_____	_____
	C. Increased number and quality of educational opportunities for the economically disadvantaged	_____	_____
	D. Creation of valid feedback to the universities as to the quantity and quality of their educational programs	_____	_____
	E. Increased numbers and diversity of students enrolled	_____	_____
	F. A decrease in the percentage of graduates who choose graduate training	_____	_____
	G. Increased stratification; permanent second-class citizenship for minorities	_____	_____
	H. Increased concern with cost of education	_____	_____
	I. If offered as an option, a low percentage of students choosing deferred tuition . .	_____	_____

Event	Likelihood	Effect
5. Machine Tutors: individual students proceed at their own pace through responsive communication with computer terminal (Previous Estimate of Feasibility: High)	_____	NA
Assuming the above event occurs, the following events might occur:		
A. Increased student/faculty interaction on an individual basis	_____	_____
B. Forced understanding of the teaching and learning process	_____	_____
C. Less diversity of attitudes	_____	_____
D. A continued desire for considerable human contact in the learning process	_____	_____
E. Less student identification with the educational institution	_____	_____
6. Medically Aided Learning: chemicals, hypnosis, and other means of permitting rapid assimilation of factual material--for example, a textbook can be permanently assimilated in 30 minutes (Previous Estimate of Feasibility: Moderate/Low)	_____	NA
Assuming the above event occurs, the following events might occur:		
A. Centralized control of curricula	_____	_____
B. A dependence on drugs replaces the development of self-reliance	_____	_____
C. Increased artificiality of society; distortion of "natural values"	_____	_____
D. Legal and enforcement problems; potential for thought control	_____	_____
E. Dehumanization, depersonalization, and increased alienation	_____	_____
7. Communiversities: educational institutions which are located throughout, and interdependent with, the community of which they are a part (Previous Estimate of Feasibility: Moderate)	_____	NA
Assuming the above event occurs, the following events might occur:		
A. More readily available continuing education opportunities, particularly at moderate intellectual levels	_____	_____

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Event		Likelihood	Effect
B.	Increased standardization of educational quality	_____	_____
C.	The creation of highly specialized universities which would have the role of developing leaders	_____	_____
D.	Increased university attention to applied research	_____	_____
E.	Increased interest in life-long learning	_____	_____
F.	Increased demand for cassettes to serve small, remote communities	_____	_____
G.	Increased administrative costs	_____	_____
H.	Decreased emphases on intellectual tradition; social roles of university predominate	_____	_____

COMMENTS:

TRENDS

Trends which were perceived to be important to the development of the university were included on the third questionnaire. You were requested to rate them according to their present strength and future behavior.

Results for five of these trends are summarized below. "Present Strength" and "Future Behavior" are described by the median (middle) response. When the variation of the responses indicated some uncertainty as to the behavior of the trend, this is indicated with the conjunction or. (For example, in 2, the trend is described as "increasing or unchanged", indicating that the respondents were not in general agreement.)

After reviewing these results, consider the questions on the next page.

Perceived Trend	Present Strength (Median Response)	Future Behavior
1. Trend toward service economy, and thus an increasing number of people required in labor-intensive service industries	Moderate	Increasing through 1985; remaining unchanged from 1986-2000
2. Increased emphasis on educational technology and automated information handling services	Moderate	Increasing or Unchanged through 1975; Increasing from 1976-2000
3. Increasing opportunity for, and recognition of, informal (outside the classroom) learning	Slight	Increasing through 1986; remaining unchanged or increasing from 1986-2000
4. Increasing need for continuing education and retraining because of rapid obsolescence of education and occupations	Moderate	Increasing through 2000 (perhaps strongly increasing 1976-1985)
5. Increasing federal and state involvement in university planning and operations through the increasing dependency of the university on public funds; distinction between private and public institutions becoming blurred	Moderate	Increasing through 1985; remaining unchanged 1986-2000

Assume that these trends are accurately described by these results, and consider their meaning for the university: what should be the university's response to the trend? What problems or opportunities are suggested by the trend? Write your comments below.

Trend	Comment
1. Service economy -	
2. Educational Tech./Auto. info. handling -	
3. Informal Learning -	
4. Continuing Education -	
5. Federal and State Involvement -	

APPENDIX F

Number of Participants Responding to Questionnaires

TABLE 10. NUMBER OF RESPONDENTS TO "UNIVERSITY ROLES" SECTION OF QUESTIONNAIRES

	Questionnaire Number:			
	1	2	3	4
University Administrators	5	2	3	3
Faculty and Researchers	8	3	6	8
Students	5	2	4	3
Government, Industry and Others	7	2	5	3
TOTAL	25	9	18	17

TABLE 11. NUMBER OF RESPONDENTS TO "STUDENT ATTITUDES" SECTION OF QUESTIONNAIRES

	Questionnaire Number:			
	1	2	3	4
University Administrators	5	1	1	*
Faculty and Researchers	6	3	5	*
Students	5	4	4	*
Government, Industry and Others	6	1	1	*
TOTAL	22	9	11	*Section deleted

TABLE 12. NUMBER OF RESPONDENTS TO "EFFECTS OF EDUCATION (UNDERGRADUATE)" SECTION OF QUESTIONNAIRES

	Questionnaire Number:			
	1	2	3	4
University Administrators	4	1	1	1
Faculty and Researchers	8	4	4	5
Students	5	4	4	3
Government, Industry & Others	6	2	2	2
TOTAL	23	11	11	11

TABLE 13. NUMBER OF RESPONDENTS TO "EFFECTS OF EDUCATION (GRADUATE)" SECTION OF QUESTIONNAIRES

	Questionnaire Number:			
	1	2	3	4
University Administrators	4	2	1	*
Faculty and Researchers	7	5	5	*
Students	3	1	0	*
Government, Industry & Others	6	3	3	*
TOTAL	20	11	9	*Section deleted

TABLE 14. NUMBER OF RESPONDENTS TO "TRENDS" SECTION OF QUESTIONNAIRES

	Questionnaire Number:			
	1	2	3	4
University Administrators	5	3	1	2
Faculty and Researchers	7	6	4	7
Students	2	3	2	1
Government, Industry & Others	7	5	5	6
TOTAL	21	17	12	16

TABLE 15. NUMBER OF RESPONDENTS TO "INNOVATIONS" SECTION OF QUESTIONNAIRES

	Questionnaire Number:			
	1	2	3	4
University Administrators	3	2	1	2
Faculty and Researchers	8	7	5	8
Students	3	3	0	2
Government, Industry & Others	7	5	4	6
TOTAL	21	17	10	18

APPENDIX G

Acknowledgement of Delphi Participants

ACKNOWLEDGMENT

While the individual contributions of the study participants will remain anonymous, these contributions made the study possible. The participants should be credited with a wide range of knowledge, with a wealth of ideas and concepts, and with persistence and commitment to the study even when faced with ambiguous and clumsily-worded questions. The participants can not be held responsible for the conclusions expressed in this report nor for the final study results.

The following respondents have permitted their participation to be acknowledged. They are listed in alphabetical order, followed by their position, affiliation, and (in parentheses) their areas of knowledge and interest.

Norman R. Baker, Associate Professor of Industrial & Systems Engineering, Georgia Institute of Technology; (R&D Management; Organization Theory)

(Miss) Valerie Cihylik, Secretary, Student Activities Office, Columbia University; (Student, Student Political Groups)

Joseph F. Coates, Special Assistant to Assistant Director for Research Applications, National Science Foundations; (Science Policy, Administration of Research)

Walter Dick, Assistant Dean for Research and Development, College of Education, Florida State University; (Instructional Systems and Educational Technology)

Rogers B. Finch, Vice President of Planning, Rensselaer Polytechnic Institute; (Long Range Planning)

John C. Griffiths, Director of Planning Research, The Pennsylvania State University; (Geomathematics, Computers, Statistics, O-R in Problem-Solving)

Norman Hackerman, President, Rice University; (Chemistry)

W. Lee Hansen, Professor of Economics, University of Wisconsin; (Economics)

James Hillier, Executive Vice President, Research and Development, Radio Corporation of America; (Research and Engineering Management, Long Range Corporate Planning)

F. Craig Johnson, Professor of Higher Education, Florida State University; (Institutional Research)

John G. Lee, Director of Research (Retired), United Aircraft Corporation; Vice-Chairman, Board of Regents, University of Hartford; (Research-Education-Administration)

Ernest G. Palola, Research Sociologist, University of California-Berkeley; (Long-Range Educational Planning)

Cornell F. Persico, Ph.D. Candidate, Stanford; Systems Analyst, Educational Policy Research Center, SIR: (Higher Education)

Leo E. Persselin, Director, Instructional Systems Development, Dubnoff School for Educational Therapy (Calif.); (Educational Technology)

Mark Phillip Rice, Student President & Grand Marshall, Rensselaer Polytechnic Institute;(Engineering, People, and Poetry)

David J. Rose, Professor of Nuclear Engineering, MIT; Former Director of Long Range Planning, ORNL: (Science Policy, Longe Range Planning)

Einar Stefferud, Consultant, Einar Stefferud and Associates (Calif.); (Computer Management in Universities)

Stuart Umpleby, Research Associate, Institute of Communications Research; University of Illinois at Urgana - Champaign; (Computer-based Education, Methods of Public Involvement in Community Planning)

Robert Watson, Student President, University of Minnesota - Morris; (Public Administration, Educational Reform)

Jeremy R. Wilson, Planning Coordinator, Northwestern University; (Higher Education Administration)

APPENDIX H

Additional Detailed Questionnaire Results

Table 16. Ratings of Innovation Impact and Desirability, from Questionnaire 2

Innovation Number	Impact				Desirability			
	Med	Great	Med	Slight	E.Des.	E.Und.	Other	Med
1	M	5	11	1	7	0	10	O
2	M	4	8	5	5	1	11	O
3	M	6	10	1	7	1	9	O
4	M	7	8	2	6	2	9	O
*5	G	11	5	1	8	2	7	O
6	M	7	8	2	12	1	5	D
7	M	6	10	0	12	0	3	D
*8	M	8	9	0	8	1	8	D/O
9	M	4	10	3	8	3	6	D
*10	M	8	7	2	7	2	8	O
*11	M	7	6	4	10	4	3	D
12	G	8	9	0	15	9	2	D
13	G	9	8	0	13	1	3	D
14	M	6	9	2	5	3	9	O
15	M	5	9	3	10	1	6	D
16	G	13	3	1	13	1	3	D
17	M	9	7	1	12	0	5	D
*18	G	9	7	1	3	3	11	O
19	M	3	7	7	6	0	11	O
20	M	8	6	3	8	1	8	O
*21	G	11	5	1	10	2	5	D
22	M	7	8	2	9	1	7	D
*23	G	14	2	1	4	6	7	O
*24	M	8	7	2	3	10	4	U
25	M	8	9	0	12	1	4	D
26	G	10	6	1	12	0	5	D
27	M	6	8	3	6	2	9	O
*28	G	12	4	1	10	0	7	D
29	M	8	7	2	7	1	9	O
30	M	3	7	6	6	0	10	O
31	M	6	7	4	8	1	8	O
32	G	9	6	1	11	0	5	D
33	M	8	8	0	14	0	2	D

*Additional consideration requested on Questionnaire 3.

Table 17. Relative Importance of Factors in Students' Attitudes
(From the results of Questionnaire 3)

Factor	Rng.	Med. Wt.	Chg.
1. Intrinsic attitudes--as the student attempts to escape from parental restraints, prior disrespect for past accomplishments of society; underestimating problems of the future; lack of commitment to train himself to make improvements	6 5	6	0
2. Atmosphere of self-determination--opportunity for independent thought, lack of value structure	9 6	8	+
3. Clarity of goals and objectives--institutional and personal	8 6	7.5	0
4. Change from parental permissiveness to institutional rigidity--conduct codes for students, relationships with parents, carry-over of controls over his social freedom from lower school and parents	5 2	4	-
5. Selection process for entry into the university	3 2	2	0
6. Disappearance of the common man's immortality--the possibility of making the world a better place to live in for one's grandchildren seems remote	7 3	5	+
7. Disappearance of both physical and intellectual frontiers	4 2	4	0
8. National policy--draft, Vietnam, foreign policy, domestic policies, perceived trend of increasing government control	9 8	8.5	NA
9. Nuclear warfare possibilities	6 5	5	0
10. Attitude of national leaders to youth; pontification by members of the "establishment"	8 6	7	+
11. Fashions in "intellectual snobishness"	5 2	3	0
12. Perception of hypocrisy in others, especially adults	9 6	7	+
13. Social concerns--perceived racism; race riots; environmental pollution; unemployment	9 8	8.5	+
14. Perceived capability to effect reform--to change current political and social situations; failure to understand the fly wheel analogy; efforts to speed up fly wheel of society do count, but effort to make noticeable change is quite prodigious	9 7	8	+
15. Personal concerns--relationship of one's self to society, lack of secure feeling about one's personal future	9 8.5	9	+
16. Rapidity of social change; changes in value, changing from one era to another, "future shock" and rapid technological change	8.5 7	8	+
17. Complex information environment--effectiveness of mass communication media, quick molding of attitude and opinion, lack of a filter which permits one to distinguish among information with different values and manipulated information, the exposure of failures to live up to advertised ideals	8 6	7	+

NA = No Agreement.

Table 17. (Continued)

Factor	Rng.	Med. Wt.	Chg.
18. The education and attitude of parents	7 5	5	0
19. The process of physiological development--different than in former times	3 2	3	0
20. Failure to comprehend competitive society--the pervasive determination of some individuals to impose their will over others	6 5	6	0
21. Societal emphasis on the need for an education--college becomes something that is required	8 5	7	NA
22. Perceived insufficiency of appropriate roles for women who are college graduates	7.5 5	7	+
23. Current attempts to make education relevant	9 6	7	+
24. Discrepancy between high expectation and actual experience of higher education	8 7	8	+
25. Obsolete material--the idealization of history and the American dream in textbook is contradicted by experiences	8 7	7	+
26. University location--urban or rural	5 1.5	3	0
27. Commitment to excellence by the institution--especially top rank institutions	6 4	5	0
28. Campus culture and tradition--reputation of student activism, students' perceptions of acceptable social behavior; need to rebel and the guilt generated by this need	7 5	6	0
29. University emphasis--liberal art or science and engineering; support of national causes (defense); institutional and individual roles in society (filling slots); roles perceived differently by student and by institution; lack of identity with the university as an institution	8 7	7.5	NA
30. Cross section of fellow students--social and racial composition of student body; lack of diversity	6 4	5	0
31. Attitudes of fellow students--exaggerated contact with peer groups and restricted contact with other social groups; depression and apathy breeding depression and apathy; mass psychology; contagious nature of activism, perceived connections between past, present, and future students	9 7	8	0
32. Relationships with faculty; teaching methodology--a faculty unaware of events outside the campus; the degree of faculty dedication to openness, searching, etc.; separation of faculty and administration from students' problems; faculty composition (perceived on occasion as being misfits from the outside world)	8 6	7	NA
33. University inflexibility--impersonality of institutional structure; rigidity of policies and procedures; bureaucratization; lack of opportunity to actively and meaningfully take part in university government	8 8	8	0

Table 17. (Concluded).

Factor	Rng.	Med. Wt.	Chg.
34. Rigid curriculum requirements--coupled with grading, degree requirements; antiquated curriculum vs. students' needs; lock-step educational processes for what is essentially an individual learning process	9 8	8	NA
35. Present curriculum--within disciplines, not matched to real perceived problems; more demand for "education" and less demand for "training".	8 7	8	+
36. Need for external objectives--opportunities for service such as Peace Corps, Vista, involvement in urban and environmental problems; pre-occupation with ideas and beliefs and little outlet for social action; need for experiences to recognize the "why" of a course	8 5	6	+
37. Increased personal affluence . . .	5 3	4	0

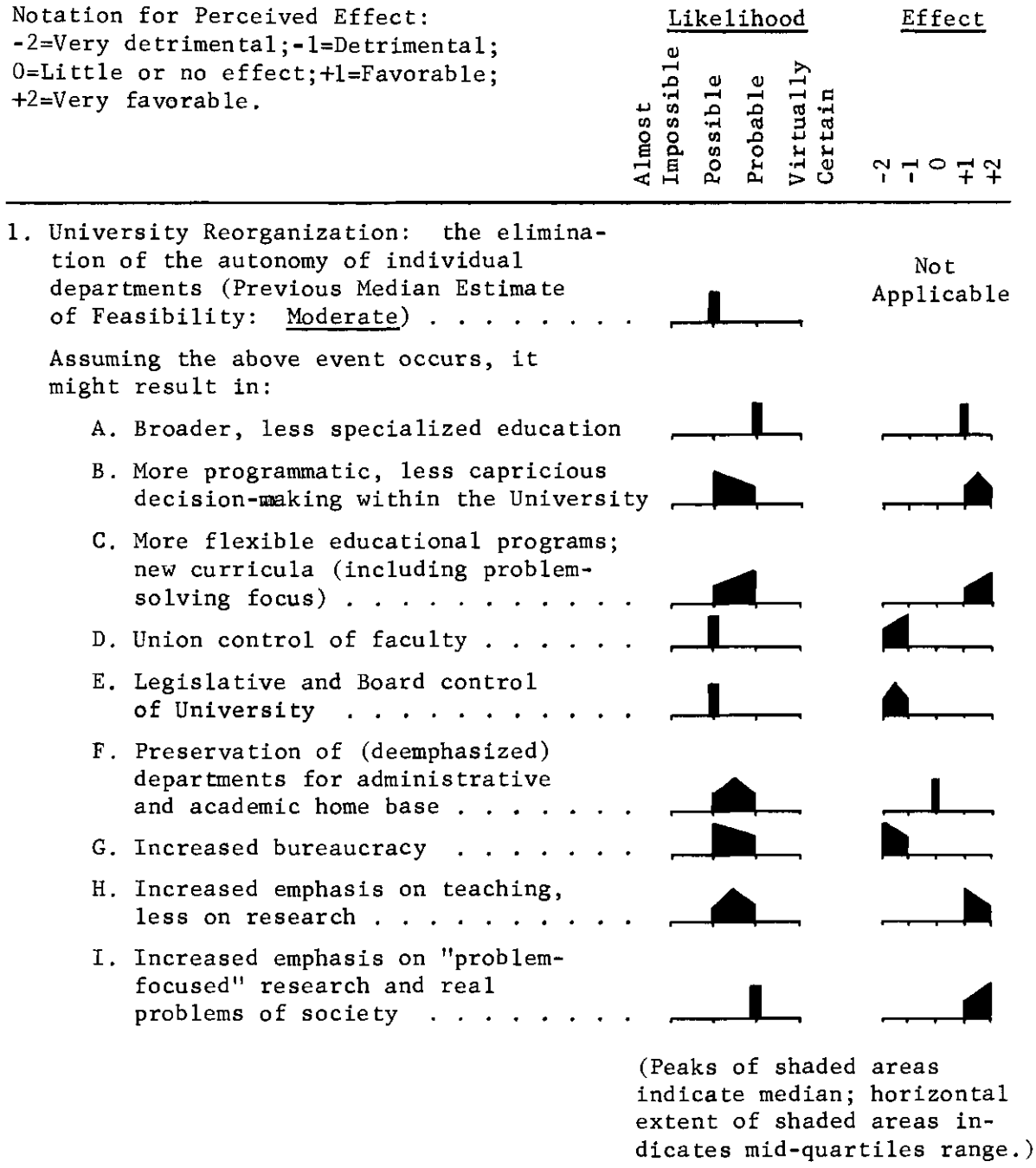


Figure 12. Potential Consequences of Eliminating Departmental Autonomy.

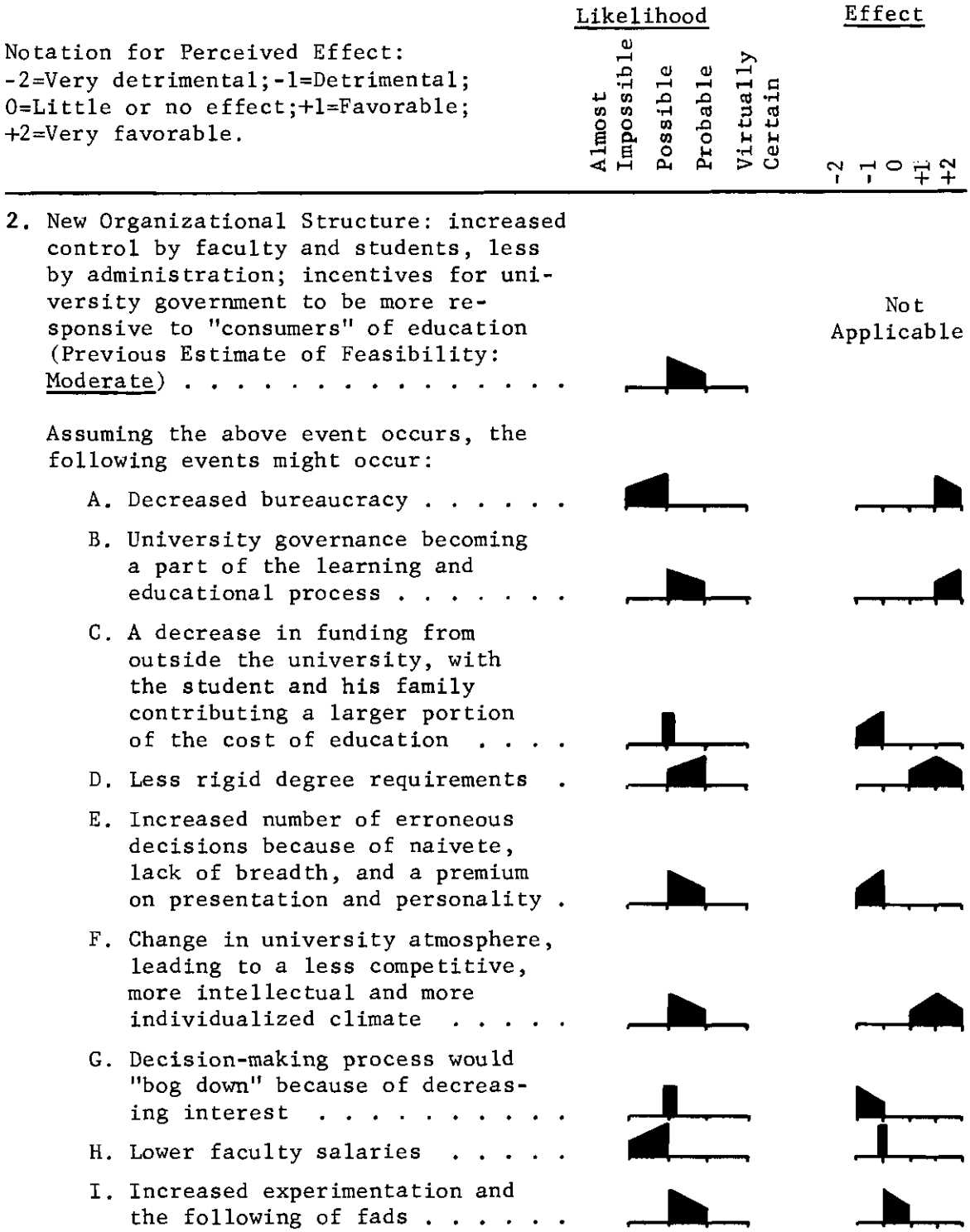


Figure 13. Potential Consequences of Increased Student and Faculty Control.

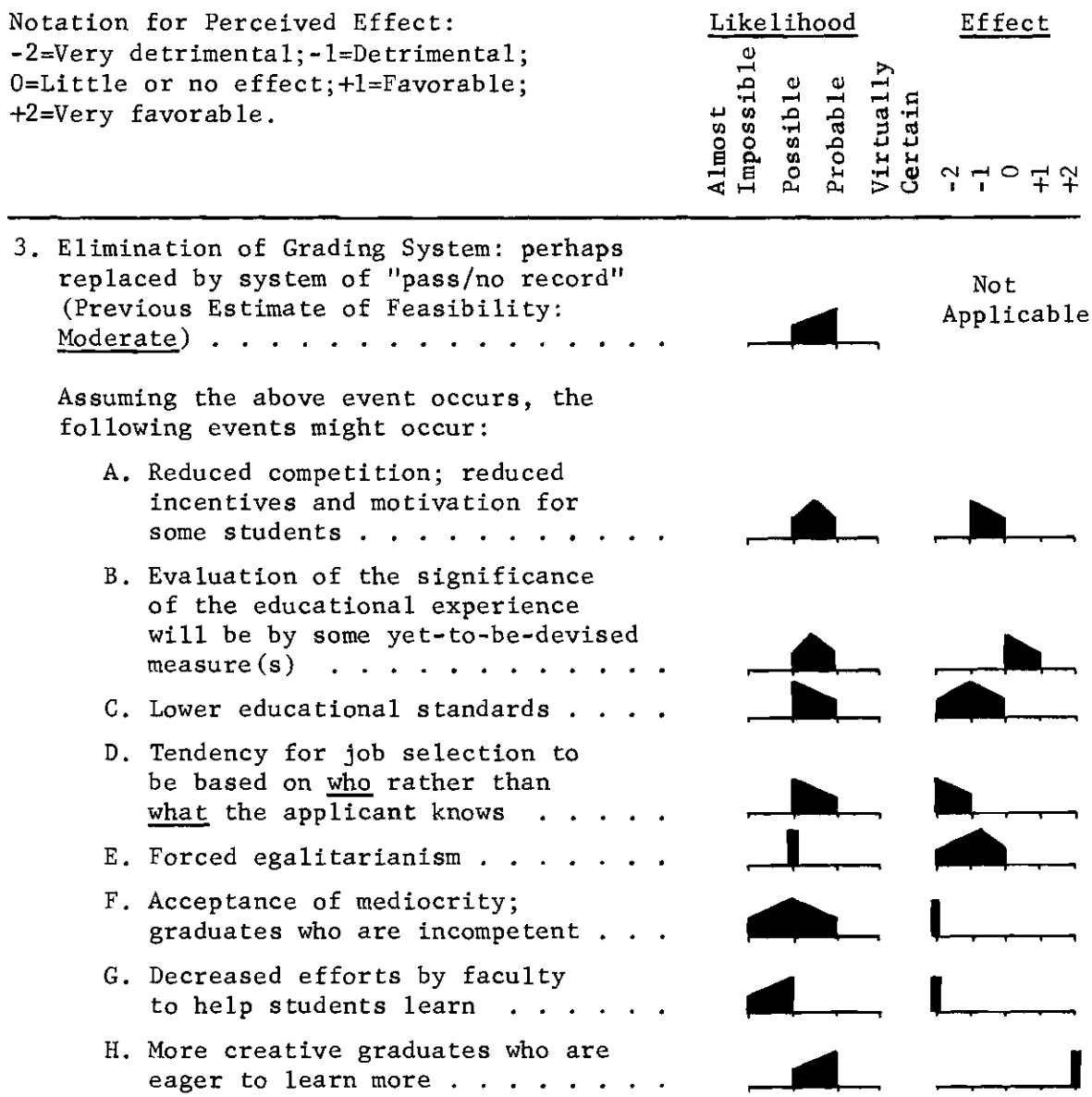
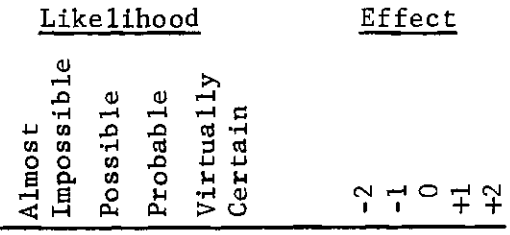


Figure 14. Potential Consequences of Eliminating Grading System.

Notation for Perceived Effect:
-2=Very detrimental; -1=Detrimental;
0=Little or no effect; +1=Favorable;
+2=Very favorable.



4. Long-term Deferred Tuition: students can make the investment decision regarding the worth of an education with respect to future earning potential (Previous Estimate of Feasibility: High) . . . . . Not Applicable

Assuming the above event occurs, the following events might occur:

A. A decrease in the percentage of students who choose to attend college . . . . . .

B. Forgiveness programs, based on performance after graduation . . . . . .

C. Increased number and quality of educational opportunities for the economically disadvantaged . . . . . .

D. Creation of valid feedback to the universities as to the quality and quantity of their educational programs . . .

E. Increased numbers and diversity of students enrolled . . . . . .

F. A decrease in the percentage of graduates who choose graduate training . . . . . .

G. Increased stratification; permanent second-class citizenship for minorities . . . . . .

H. Increased concern with cost of education . . . . . .

I. If offered as an option, a low percentage of students choosing deferred tuition . . . . . .

Figure 15. Potential Consequences of Long-Term Deferred Tuition.

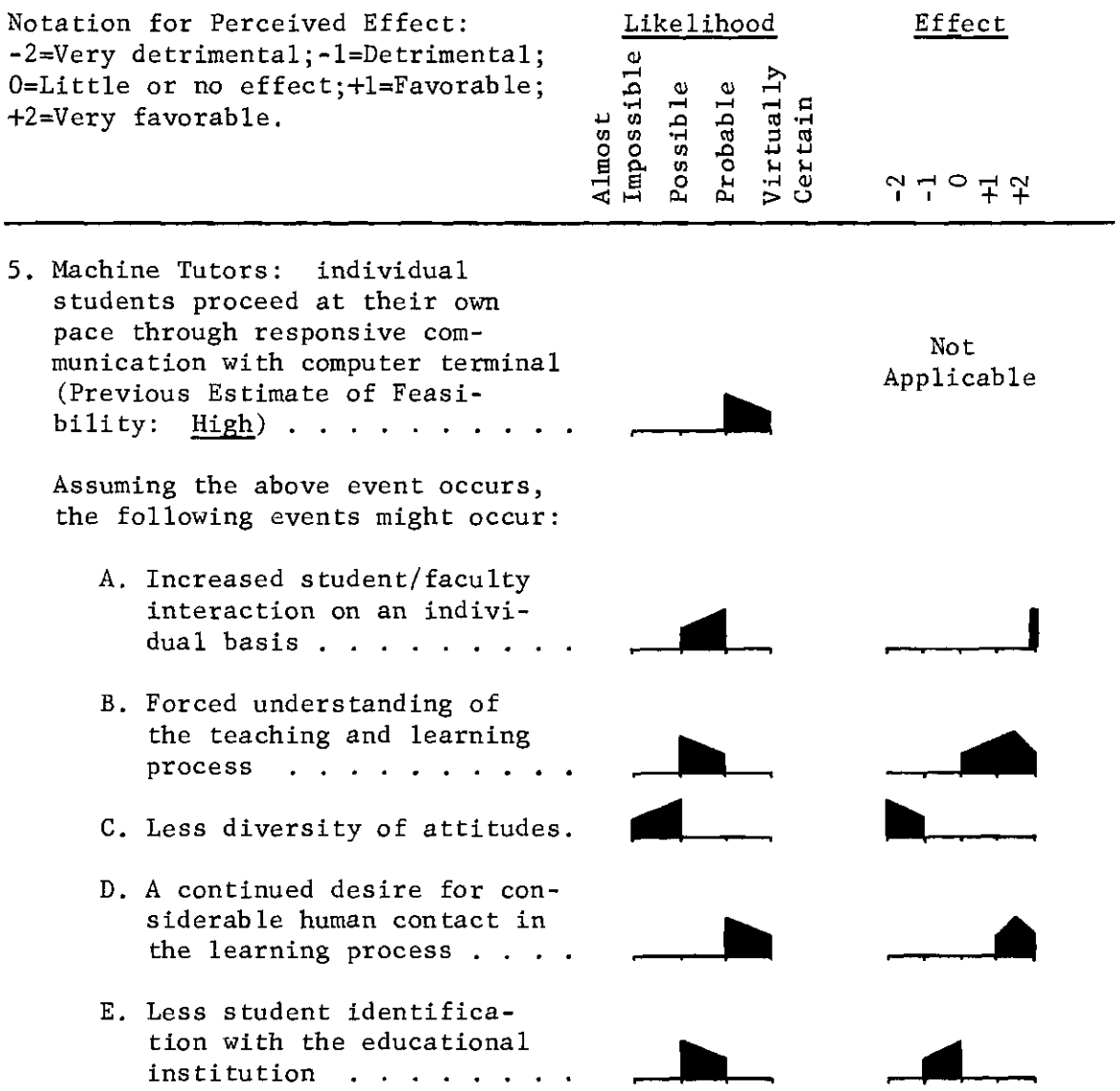
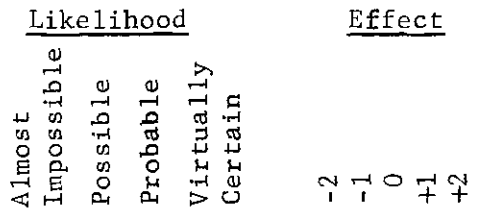


Figure 16. Potential Consequences of Machine Tutors.

Notation for Perceived Effect:
-2=Very detrimental; -1=Detrimental;
0=Little or no effect; +1=Favorable;
+2=Very favorable.



6. Medically Aided Learning: chemicals, hypnosis, and other means of permitting rapid assimilation of factual material--for example, a textbook can be permanently assimilated in 30 minutes (Previous Estimate of Feasibility: Moderate/Low) . . . . . Not Applicable

Assuming the above event occurs, the following events might occur:

A. Centralized control of curricula

B. Dependence on drugs replaces the development of self-reliance . . . . . .

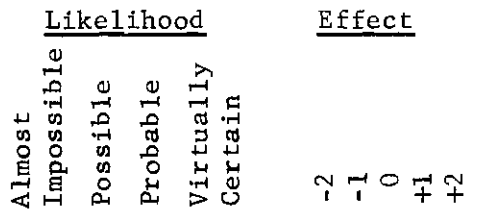
C. Increased artificiality of society; distortion of "natural values" . . . . . .

D. Legal and enforcement problems; potential for thought control . . . . . .

E. Dehumanization, depersonalization, and increased alienation . . . . . .

Figure 17. Potential Consequences of Medically Aided Learning.

Notation for Perceived Effect:
-2=Very detrimental; -1=Detrimental;
0=Little or no effect; +1=Favorable;
+2=Very favorable.



7. Communiversities: educational institutions which are located throughout, and interdependent with, the community of which they are a part (Previous Estimate of Feasibility: Moderate). . .

Not Applicable

Assuming the above event occurs, the following events might occur:

A. More readily available continuing education opportunities, particularly at moderate intellectual levels . . . . . .

B. Increased standardization of educational quality . . . . . .

C. The creation of highly specialized universities which would have the role of developing leaders . . . . . .

D. Increased university attention to applied research . . . . . .

E. Increased interest in life-long learning . . . . . .

F. Increased demand for cassettes to serve small, remote communities . . . . . .

G. Increased administrative costs .

H. Decreased emphases on intellectual tradition; social roles of university predominate . . . . . .

Figure 18. Potential Consequences of Communiversities.

APPENDIX I

Participant Evaluation, Included with Final Questionnaire

Your comments on the study are requested.

Overall Reaction:

____Exciting, stimulating; would participate in others like it

____Interesting, useful

____So-so, ho-hum

____Rather distasteful and probably not very useful

____Boring; a complete waste of time

____Other:

Which sections of the questionnaires did you find:

Most useful:

Most difficult or most ambiguous:

Most interesting or most stimulating:

Least useful:

Least interesting:

What policy issues did the study raise or help bring into sharper focus?

Other comments or suggestions:

With your permission, I would like to acknowledge your participation in this study by listing your name in the final report. (Individual contributions to the study will remain anonymous.) If you prefer that your name not be listed, leave blank the spaces below.

NAME_____

POSITION/TITLE_____

INSTITUTION/COMPANY_____

PRIMARY AREA OF KNOWLEDGE AND INTEREST_____

RESPONDENTS' REACTIONS

Overall Reaction:

__4__ Exciting, Stimulating; would participate in others like it

__13__ Interesting, useful

__6__ So-so, ho-hum

__2__ Rather distasteful and probably not very useful

__0__ Boring; a complete waste of time

__1__ Other

Which Sections of the Questionnaires did you find:

	Roles	Attitudes	UG Characteristics	G Characteristics	Innovations	Trends
useful:	7	1	2	2	1	1
Most difficult or most ambiguous:	3	1	5	2	4	2
Most interesting or most stimulating:	6	0	2	1	2	1
Least useful:	0	0	1	1	1	2
Least interesting:	0	0	2	1	0	2

APPENDIX J

Delphi Study Results Listed by Systems Levels

DELPHI STUDY RESULTS LISTED BY SYSTEMS LEVELS

I = Innovation T = Trend

Framework Level

I-4 Reemergence of presidential leadership

I-5 Elimination of individual department autonomy

I-8 New organizational structure - faculty and student control

T-11 Challenges to departmental structure

T-13 Increasing student involvement in decision-making

Clockwork Level

I-1 New language

I-3 Mass computer utilities

I-9 Doctoral program with teaching emphasis

I-12 Diverse degree tracks

I-13 Undergraduate edcuation includes variety of experiences

I-14 Multiple bachelor-level degree programs

I-15 "Distilled" courses

I-21 Machine tutors

I-22 Multi-media teaching machines

I-23 Medically aided learning

I-24 Replacement of lectures by books

I-25 Widespread use of TV tape cassettes

I-27 New mass communication device

I-30 Dispersed classrooms

Clockwork Level (continued)

I-33 Simplified information storage and retrieval

T-4 Emphasis on educational technology and information handling

T-8 Emphasis on problem-solving approach

T-9 Widespread use of "Synthesis" approach

T-17 Informal learning

Thermostat Level

I-6 Application of PPBS and other management systems to university

I-7 Participating decision-making

I-10 Grading system eliminated

T-10 Environmental concern and dynamic equilibrium emphasis

T-12 Participatory organizations

Cell Level

I-2 30-hour work week

I-11 Long term deferred tuition

I-16 New educational time scale

I-17 Processes to retread

I-18 Acceptance of universality of college degree

I-29 Electronic world university

I-31 University without walls

T-1 War in SE Asia

T-2 Service economy

T-3 Tightening job market for professionals

T-6 Disillusionment with science and technology

T-7 Diffusion of experimental attitude

Cell Level (continued)

T-15 Rise in human intelligence

T-18 Recognition of nonessential nature of college attendance

T-19 Increasing number of enrollments

T-20 Need for continuing education

T-23 Cost of education

T-24 Dependency of university on public funds

T-25 Funding gaps

Plant Level

I-19 Student community concept

I-20 Small educational units

I-26 Smaller classes

Animal Level

T-14 Politicization of university

T-16 Education to discover potential of man

T-21 Separation of research activities from university

Human Level

All alternative roles (listed in Figures 4-8)

I-28 Communiversities

T-5 Divergence of objectives

T-22 Emphasis on community colleges

Social Level

I-32 Professor's role changed

APPENDIX K

Identification of Related Results

IDENTIFICATION OF RELATED RESULTS

1. Retrainer

   Implications: - Processes to retread (mature students into University)

   Implications: - professors' role changed

   Requires: - machine tutors

   Facilitates: - Innovator of new methods of problem solving (role 25)

   Necessary: - Need for continuing education

2. Professional Manpower Producer

   Inhibited by: - Tightening job market for professionals

   Necessary: - Diverse degree tracks

   Facilitates: - Social interface (role 21)

3. Educator of Leaders

4. Educator of Revolutionaries

   Implications: - Politicization of the University

   Inhibits: - Reference, authority (role 11)

   - Political Force (role 10)

   - Divergence of objectives

   Inhibits: - Socializing agent (role 8)

   - Social servant (role 17)

5. Educator of Liberal Arts

   Implications: - Education to discover potential of man

   - Supporter of culture (role 20)

   Implications: - undergraduate education includes variety of experiences

Facilitated by: - Communiversity (I-28)

6. Mass Educator - practical things

Implications: - Undergraduate education includes variety of experience

Implication: - Communiversity

- Emphasis on educational technology
- Increasing number of enrollments
- Acceptance of universality of college degree
- Machine tutors

Implication: - professors' role changes

7. Mass Educator - how to think, learn

Requires: - Emphasis on problem-solving approach

Implications: - Emphasis on educational technology

- Acceptance of universality of college degree
- Machine tutors

Implication: - Professors' role changes

8. Socializing Agent

Implications: - Informal learning

Implication: - student community concept

Facilitates: - Social interface (role 21)

9. Advisor, Counselor

Implications: - Diverse degree tracks

- Informal learning

10. Political Force

Inhibits: - Reference, authority (role 11)

Implications: - critic, evaluator (role 12)

- Problem definer, societal adviser (role 13)
- Social Servant (role 17)

  Requires: - Applications of PPBS

  Implications: - dependency on public funds
  - applied researcher (role 19)

  Implications: - Innovator of new methods of problem-solving (role 25)

- Basic Researcher (role 18)

11. Reference, Authority

    Implications: - critic, evaluator (role 12)
    - problem definer, societal adviser (role 13)
    - social servant (role 17)

      Requires: - application of PPBS, etc.

      Implications: - dependency of public funds
      - applied researcher (role 19)

        Implication: - innovator of new methods of problem-solving (role 25)

    - Basic researcher (role 18)

12. Critic, Evaluator

13. Problem Definer, societal advisor

14. Originator, stimulator of alternatives

    Implications: - applied researcher (role 19)

      Implication: - Innovator of new methods of problem-solving (role 25)

15. Executor of Pilot Projects

Implications: - communiversities

16. Implementor of Large-Scale Projects

Implications: - communiversities (I-28)

- depending on public funds

- application of PPBS, etc.

17. Social Servant

Requires: - application of PPBS, etc.

Implications: - dependency on public funds

- applied researcher (role 19)

Implication: - innovator of new methods of problem-solving (role 25)

18. Basic Researcher

Implications: - reference, authority (role 11)

19. Applied Researcher

Implications: - Innovator of new methods of problem-solving (role 25)

20. Supporter of Culture

Implications: - undergraduate education includes variety of experiences

Implication: - communiversity (I-28)

- Educator for liberal arts (5)

21. Social Interface

22. Employer

23. Entertainer

24. Operator of Communications Media

Implications: - University without walls

- Entertainer (role 23)

- Dispersed classrooms

25. Innovator of New Methods of Problem-Solving

Implications: - Applied Researcher (role 19)

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